MS400870M

24 Port GBE SFP Switch 19" 1U
24X10/100/1000T Combo 100/1000X SFP

Network Management

User's Guide

Version 0.96

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- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet from that the receiver is connected.
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Revision History

Manual Version	Modification	Firmware Version	Date
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0.96	Modify quick keys	1.07.00	2009/06

Note: *This User's Manual is written or revised according to the officially-released Firmware version. The content of this Manual is subject to change without prior notice.*

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1. INTRODUCTION

Thank you for using the 24 dual speed combo ports plus 2 Giga combo port Managed Switch. The built-in management module allows users to configure this Managed Switch and monitor the operation status locally or remotely through the network.

1.1 Interface

There are 4 models in MS400870M Series. Descriptions and interface figures are provided below:

MS400870M-1A – 24 dual speed combo ports plus 2 Giga combo port managed Switch fixed 1 AC

MS400870M-2A – 24 dual speed combo ports plus 2 Giga combo port managed Switch fixed 2 Redundant AC

MS400870M-1D – 24 dual speed combo ports plus 2 Giga combo port managed Switch fixed 1 DC

MS400870M-2D – 24 dual speed combo ports plus 2 Giga combo port managed Switch fixed 2 Redundant DC

These 4 models have the same front panel:

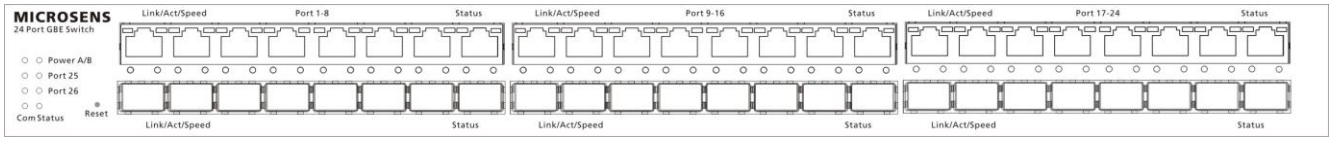


Figure 1: MS400870M Series Front Panel

Each model has different rear panel format:

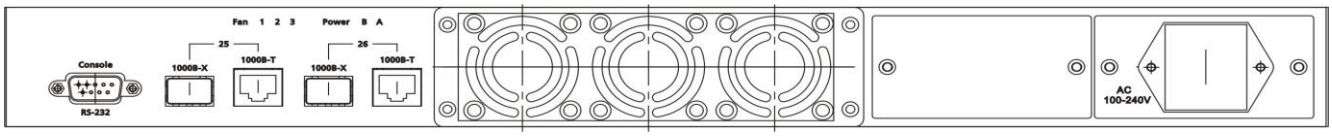


Figure 2-1: MS400870M-1A Rear Panel

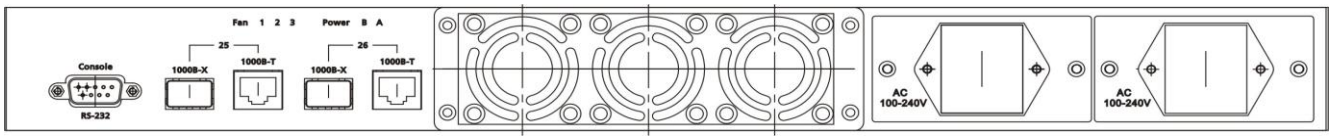


Figure 2-2: MS400870M-2A Rear Panel

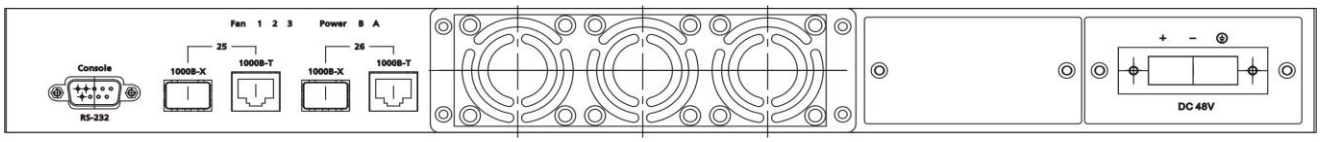


Figure 2-3: MS400870M-1D Rear Panel

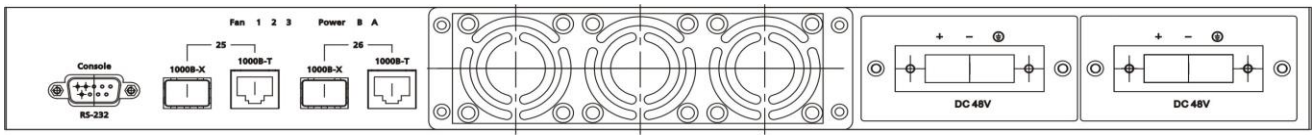


Figure 2-4: MS400870M-2D Rear Panel

1.2 Management Options

Switch management options available in MS400870M Series are listed and described below:

- Local Console Management
- Telnet Management
- SNMP Management
- WEB Management

Local Console Management

Local Console Management is done through the RS-232 DB-9 Console port located in the back of the MS400870M Series Switch. Direct RS-232 cable connection between the PC and the Managed switch is required for this type of management.

Telnet Management

Telnet runs over TCP/IP and allows you to establish a management session through the network. Once the Managed switch is on the network with proper configurations, you can use Telnet to login and monitor its status remotely.

SNMP Management

SNMP is also done over the network. Apart from standard MIB (Management Information Bases), an additional private MIB is also provided for SNMP-based network management system to compile and control.

Web Management

Web Management is done over the network and can be accessed via a standard web browser, such as Microsoft Internet Explorer. Once the Managed switch is available on the network, you can login and monitor the status of it through a web browser remotely or locally. Local Console-type Web management, especially for the first time use of the Managed Switch to set up the needed IP, can be done through one of the 10/100Base-TX 8-pin RJ-45 ports located at the front panel of the Managed Switch. Direct RJ45 LAN cable connection between a PC and the Managed Switch is required for Web Management.

1.3 Management Software

Following is a list of management software choices for MS400870M Series:

- Managed switch CLI interface
- SNMP-based Management Software
- Web Browser Application

Console Program

The Managed Switch has a built-in, Command Line Interface called the CLI which you can use to:

- Configure the system
- Monitor the status
- Reset the system

You can use CLI as the only management system. However, other network management option - SNMP -based management system is also available.

You can access the text-mode Console Program locally by connecting a VT100 terminal - or a workstation running VT100 emulation software - to the Managed Switch RS-232 DB-9 Console port directly. Or, you can use Telnet to login and access the CLI through network connection remotely.

SNMP Management System

Standard SNMP-based network management system is used to manage the Managed Switch through the network remotely.

When you use a SNMP-based network management system, the Managed switch becomes one of the managed devices (network elements) in that system. The Managed switch management module contains an SNMP agent that will respond to the requests from the SNMP-based network management system. These requests, which you can control, can vary from getting system information to setting the device attribute values.

The Managed Switch's private MIB is provided for you to install in your SNMP-based network management system.

Web Browser Application

You can manage the Managed Switch through a web browser, such as Internet Explorer or Netscape, etc. (The default IP address of the Managed Switch port can be reached at **"http://192.168.0.1"**.) For your convenience, you can use either this Web-based Management Browser Application program or other network management option, for example SNMP-based management system as your management system.

1.4 Management Preparations

After you have decided how to manage your Managed Switch, you are required to connect cables properly, determine the Managed switch IP address and, in some cases, install MIB shipped with your Managed Switch.

Connecting the Managed switch

It is very important that the proper cables with the correct pin arrangement are used when connecting the Managed switch to another switches, hubs, workstations, etc.

1000Base-X / 100Base-FX SFP Port

The small form-factor pluggable (SFP) is a compact optical transceiver used in optical data communications applications. It interfaces a network device mother board (for a switch, router or similar device) to a fiber optic or unshielded twisted pair networking cable. It is a popular industry format supported by several fiber optic component vendors.

SFP transceivers are available with a variety of different transmitter and receiver types, allowing users to select the appropriate transceiver for each link to provide the required optical reach over the available optical fiber type. SFP transceivers are also available with a "copper" cable interface, allowing a host device designed primarily for optical fiber communications to also communicate over unshielded twisted pair networking cable.

SFP slot for 3.3V mini GBIC module supports hot swappable SFP fiber transceiver. Before connect the other switches, workstation or Media Converter, make sure both side of the SFP transfer are with the same media type, for example: 1000Base-SX to 1000Base-SX, 1000Bas-LX to 1000Base-LX.And check the fiber-optic cable type match the SFP transfer model. To connect to 1000Base-SX transceiver, use the multi-mode fiber cable- with one side must be male duplex LC connector type. To connect to 1000Base-LX transfer, use the single-mode fiber cable-with one side must be male duplex LC connector type.

10/100/1000Base-T RJ-45 Auto-MDI/MDIX Port

24 x 10/100/1000Base-T RJ-45 Auto-MDI/MDIX ports are located at the front of the Managed Switch. These RJ-45 ports allow user to connect their traditional copper-based Ethernet/Fast Ethernet devices to the network. All these ports support auto-negotiation and MDI/MDIX auto-crossover, i.e. either crossover or straight through CAT-5 UTP or STP cable may be used.

RS-232 DB-9 Port

The RS-232 DB-9 port is located at the rear of the Managed Switch. This DB-9 port is used for local, out-of-band management. Since this DB-9 port of the Managed switch is DTE, a null modem is also required to connect the Managed Switch and the PC.

By connecting this DB-9 port, it allows you to configure & check the status of Managed Switch even when the network is down.

IP Addresses

IP addresses have the format n.n.n.n, (The default factory setting is 192.168.0.1).

IP addresses are made up of two parts:

- The first part (for example 192.168.n.n) refers to network address that identifies the network in which the device resides. Network addresses are assigned by three allocation organizations. Depending on your location, each allocation organization assigns a globally unique network number to each network that wishes to connect to the Internet.

- The second part (for example n.n.0.1) identifies the device within the network. Assigning unique device numbers is your responsibility. If you are unsure of the IP addresses allocated to you, consult with the allocation organization where your IP addresses were obtained.

Remember that none of the two devices on a network can have the same address. If you connect to the outside network, you must change all the arbitrary IP addresses to comply with those you have been allocated by the allocation organization. If you do not do this, your outside communications will not be performed.

A subnet mask is a filtering system for IP addresses. It allows you to further subdivide your network. You must use the proper subnet mask for proper operation of a network with subnets defined.

MIB for Network Management Systems

Private MIB (Management Information Bases) is provided for managing the Managed switch through the SNMP-based network management system. You must install the private MIB into your SNMP-based network management system first.

The MIB file is shipped together with the Managed Switch. The file name extension is “.mib” that allows SNMP-based compiler can read and compile.

2. Command Line Interface (CLI)

This chapter introduces you how to use your MS400870M Series CLI, specifically in:

- Local Console
- Telnet
- Configuring the system
- Resetting the system

The interface and options in Local Console and Telnet are the same. The major difference is the type of connection and the port that is used to manage the Managed Switch.

2.1 Using the Local Console

Local Console is always done through the RS-232 DB-9 port and requires a direct connection between the switch and a PC. This type of management is useful especially when the network is down and the switch cannot be reached by any other means.

You also need the Local Console Management to setup the Switch network configuration for the first time. You can setup the IP address and change the default configuration to desired settings to enable Telnet or SNMP services.

Follow these steps to begin a management session using Local Console Management:

Step 1. Attach the serial cable the RS-232 DB-9 port located at the back of the Switch with a null modem.

Step 2. Attach the other end to the serial port of a PC or workstation.

Step 3. Run a terminal emulation program using the following settings:

- **Emulation** VT-100/ANSI compatible
- **BPS** 9600
- **Data bits** 8
- **Parity** None
- **Stop bits** 1
- **Flow Control** None
- **Enable** Terminal keys

Step 4. Press Enter to access the CLI (Command Line Interface) mode.

2.2 Remote Console Management - Telnet

You can manage the Managed Switch via Telnet session. However, you must first assign a unique IP address to the Switch before doing so. Use the Local Console to login the Managed Switch and assign the IP address for the first time.

Follow these steps to manage the Managed Switch through Telnet session:

Step 1. Use Local Console to assign an IP address of the Managed Switch,

- IP address
- Subnet Mask
- Default gateway IP address, if required

Step 2. Run Telnet.

Step 3. Log into the Switch CLI mode.

Limitations: When using Telnet, keep the following in mind:

Only two active Telnet sessions can access the Managed Switch at the same time.

2.3 Navigating CLI

The Command Line Interface (CLI) of MS400870M Series is divided into three different modes. After you enter the authorized username and password, you start from the User mode. The commands available depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

In CLI management, the User mode only provides users basic functions to operate the Managed Switch. If you would like to configure advanced features of the Managed Switch, such as, VLAN, QoS, Rate limit control, you must enter the Enable or Config mode. The CLI management of this Managed Switch is structured in a hierarchical manner which means that when you want to enter Enable mode you must start from the User mode and enter the required command and password and when you want to enter Config mode you must enter the required command in Enable mode. The following table provides an overview of this Managed Switch.

Command Mode	Access Method	Switch Prompt Displayed	Exit Method
User mode	Log in	Console>	logout
Enable mode	From user mode, enter the *enable* command	Console#	exit
Config mode	From the enable mode, enter the *config* command	Console(config)#	exit

2.3.1 Mode and command summary

Mode	Command	Access Method	Prompt	Description
User	**cfm**	While in User mode, enter **cfm** command.	Console(cfm)>	Run loopback, linktrace and delay measurement test.
	enable	While in User mode, enter the **enable** command and a password (press Enter).	Console#	Enter Enable mode.
	exit	While in User mode, enter **exit** command.	Username:	Exit from current mode.
	help	While in User mode, enter **help** command.	Console>	Show available commands that can be used in User mode.
	history	While in User mode, enter	Console>	List commands that have been used.

		history command.		
	logout	While in User mode, enter **logout** command.	Username:	Logout
	ping	While in User mode, enter the **ping** command and followed by **target IP**.	Console>	The ping test from the Managed Switch to another network unit.
	show	While in User mode, enter the **show** command or enter the **show** command and followed by **the command you would like to view its current setting**.	Console>	Show a list of commands or show the current setting of each listed command.
Enable	**Enter Enable mode**	While in User mode, enter the enable command and a password (press Enter).	Console#	Enter Enable mode.
	backup	While in Enable mode, enter the **backup** command.	Console(backup)#	Backup configuration file via FTP or TFTP.
	cfm	While in Enable mode, enter the **cfm** command.	Console(cfm)#	Run loopback linktrace and delay measurement test.
	configure	While in Enable mode, enter the **configure** command.	Console(config)#	Enter Config mode.
	Console	While in Enable mode, enter the **Console** command.	Console(Console)#	Set up time-out timer when the user is inactive.
	disable	While in Enable mode, enter the **disable** command.	Console>	Exit from current mode.
	exit	While in Enable mode, enter the **exit** command.	Console>	Exit from current mode.
	help	While in Enable mode, enter the **help** command.	Console#	Show available commands that can be used in Enable mode.
	history	While in Enable	Console#	List commands that

		mode, enter the **history** command.		have been used.
	ip	While in Enable mode, enter the **ip** command.	Console(ip)#	Configure IP addresses of the Managed Switch.
	logout	While in Enable mode, enter the **logout** command.	Username:	Logout
	ping	While in Enable mode, enter the **ping** command and followed by **target IP**.	Console#	The ping test from the Managed Switch to another network unit.
	reboot	While in Enable mode, enter the **reboot** command.	Boot-up message	To restart the Managed Switch.
	restore	While in Enable mode, enter the **restore** command.	Console#	Load factory settings
	service	While in Enable mode, enter the **service** command.	Console(service)#	Configure the network management service.
	syslog	While in Enable mode, enter the **syslog** command.	Console(syslog)#	Configure the Switch syslog parameters.
	system	While in Enable mode, enter the **system** command.	Console(system)#	Configure the Managed Switch's basic information.
	time-server	While in Enable mode, enter the **time-server** command.	Console(time-server)#	Synchronize the time of a computer client or server to another server.
	upgrade	While in Enable mode, enter the **upgrade** command.	Console(upgrade)#	Upgrade the Managed Switch's firmware and restore the previous settings.
	user	While in Enable mode, enter the **user** command.	Console(user)#	Configure user accounts.
	write	While in Enable mode, enter the **write** command.	Console#	Save configuration to the Managed Switch's flash memory.
	show	While in Enable mode, enter the **show** command or enter the **show** command and followed by **the**	Console#	Show a list of commands or show the current setting of each listed command.

		command you would like to view its current setting.		
Config	**Enter Config mode**	While in Enable mode, enter the **configure** command.	Console(config)#	In Enable mode, users can access the Switch's advanced features, such as VLAN, Rate limit, QoS, etc.
	aggr	When in Config mode, enter the **aggr** command.	Console(config-aggr)#	Configure LACP functions.
	cfm	When in Config mode, enter the **cfm** command.	Console(config-cfm)#	Configure the Managed Switch OAM 802.1ag CFM settings.
	dot1x	When in Config mode, enter the **dot1x** command.	Console(config-dot1x)#	Configure the Managed Switch to send information when 802.1x client authenticates via the Switch.
	exit	When in Config mode, enter the **exit** command.	Console#	Exit from current mode
	help	When in Config mode, enter the **help** command.	Console(config)#	Show available commands that can be used in Config mode.
	history	When in Config mode, enter the **history** command.	Console(config)#	List commands that have been used.
	igmpfilter	When in Config mode, enter the **igmpfilter** command.	Console(config-igmpfilter)#	Configure IGMP filtering settings.
	igmp	When in Config mode, enter the **igmp** command.	Console(config-igmp)#	Configure IGMP settings.
	mac	When in Config mode, enter the **mac** command.	Console(config-mac)#	Set up each port's MAC learning function.
	mirror	When in Config mode, enter the **mirror** command.	Console(config-mirror)#	Set up target port for mirroring.
	mvr	When in Config mode, enter the **mvr** command.	Console(config-mvr)#	Configure Multicast VLAN Registration (MVR) settings.
	port	When in Config	Console(config)#	Configure the status

		mode, enter the **port** command.		of each port.
	qos	When in Config mode, enter the **qos** command.	Console(config-qos)#	Set up the priority of packets within the Managed Switch.
	rstp	When in Config mode, enter the **rstp** command.	Console(config-rstp)#	Set up each port and aggregated ports' RSTP status.
	ska	When in Config mode, enter the **ska** command.	Console(config-ska)#	Configure Secure Customer Connections (SKA) settings.
	multicast	When in Config mode, enter the **multicast** command.	Console(config-multicast)#	Configure static multicast settings.
	switch	When in Config mode, enter the **switch** command.	Console(config-switch)#	Set up acceptable frame size and address learning, etc.
	vlan	When in Config mode, enter the **vlan** command.	Console(config-vlan)#	Set up VLAN mode and VLAN configuration.
	show	When in Config mode, enter the **show** command or enter the **show** command and followed by **the command you would like to view its current setting**.	Console(config)#	Show a list of commands or show the current setting of each listed command.

2.3.2 General commands and quick keys

2.3.2.1 Quick keys

Using the key or entering the command…	To do this…
Enter the "?" commands	Obtain a list of available commands in the current mode.
Enter the "help" commands	Obtain a list of available commands in the current mode.
Enter incomplete characters then enter the question mark (?)	List all commands similar to incomplete characters.
Enter the "exit" command	Return to the former mode or login screen.
Enter the "history" command	List all commands that have been used.

Press the direction ↑ or ↓ key	Scroll through the command history.
Enter unique part of a command and press TAB key	The switch will automatically display the full command.

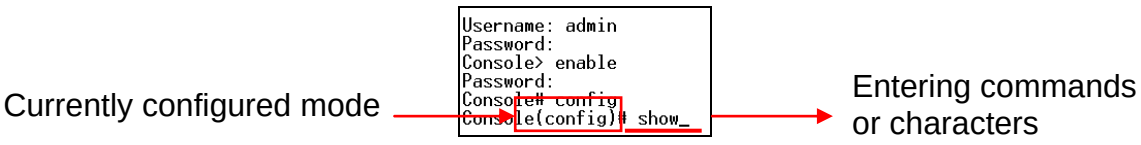
2.3.2.2 Listing Command

After entering the question mark (**?)** at the prompt line, the screen will show a list of commands available for each command mode.

```
Username: admin
Password:
Console>
   2 - Command          3 - Purpose & Description          4 - Usage
==================  ==========================  ============================
cfm                 Enter CFM. Measure          cfm
enable              Enter Enable. Mode          enable
exit                Exit from current mode      exit
help                Show available commands     help
history             Show history commands       history
logout              User logout                 logout
ping                Ping to Target IP           ping

show                Show System Information     show <...>
1 - Console> _
```

1. Command Prompt: The command prompt shows the mode that is currently configured. Users can type in commands or characters after the prompt.



2. Command: This column lists all commands that are available in the current mode.

3. Purpose & Description: This column lists each command's purpose and description in the current mode.

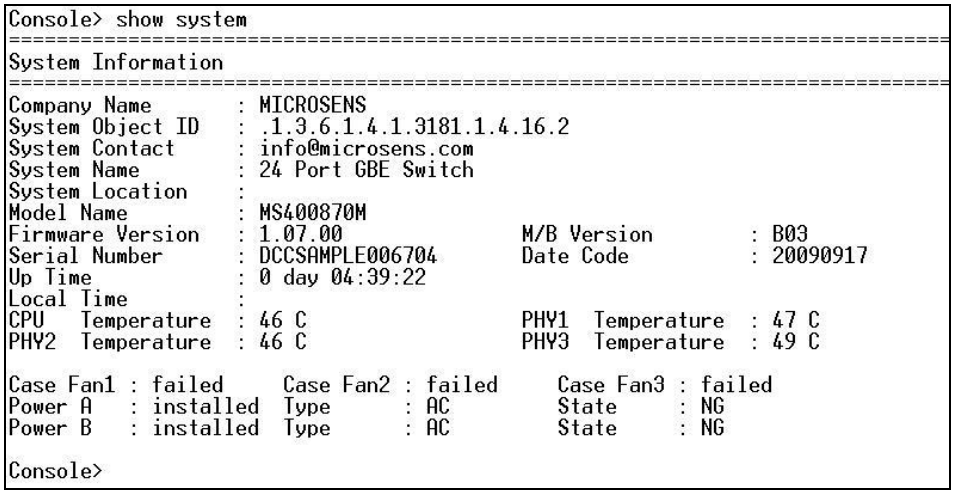
4. Usage: This column lists each command's usage in the current mode.

2.3.2.3 Show command

In each mode, users can enter **show** command to view a list of commands, view each command's current setting, and view system information. The following explains how "show" command is used in MS400870M Series.

Show system

When you enter **"show system"** command in each mode, you will be informed of system information. The following screen page shows a sample of system information in User mode.



Company Name: This shows the company name or related information.

System Object ID: This shows the predefined System OID.

System Contact: This shows the system contact information.

System Name: This shows the system name or related descriptions.

System Location: This shows the system location.

Model Name: This shows the product model name.

Firmware Version: This shows the firmware version of this Managed Switch.

M/B Version: This shows the motherboard version of this Managed Switch.

Serial Number: This shows the serial number of this Managed Switch.

Date Code: This shows the date code of this Managed Switch.

Up Time: This shows how long this Managed Switch has been turned on since the last reboot.

Local Time: This shows the local time of the device.

Show available commands

In User, Enable and Config mode, you can type **“show”** to view a list of commands available.

```
Console> show
      Command          Purpose & Description              Usage
==================  ========================  ============================
aggr                Link Aggregation          aggr [lacp]
backup              Configuration Backup      backup
cfm                 CFM Information           cfm [...]
console             Console Information       console
dot1x               IEEE 802.1X               dot1x [...]
even-log            Show even log             even-log [clear]
igmpfilter          IGMP Filter Information   igmpfilter [...]
igmp                IGMP Snooping Information igmp [...]
ip                  IP Information            ip
mac                 MAC address table         mac [dump]
mirror              Port mirroring            mirror
mvr                 MVR Information           mvr [group]
port                Port Information          port [...]
qos                 Quality of Service        qos [...]
rstp                Rapid STP                 rstp [...]
service             System Service Information service [snmp]

Press Ctrl-C to exit or any key to continue!
```

Show a Command's Current Settings

In User, Enable and Config mode, you can type "show" and followed by the command listed above to view its current setting. For example, if you type **"show qos"** in User mode (Console>), then the current setting of qos command will be displayed.

```
Console> show qos
================================================================================
QoS port Information
================================================================================
Port  Default  Tag Priority  QCL ID  Mode      Weight
----  -------  ------------  ------  --------  --------------------
1     Low      0             1       Strict    1    /2    /4    /8
2     Low      0             1       Strict    1    /2    /4    /8
3     Low      0             1       Strict    1    /2    /4    /8
4     Low      0             1       Strict    1    /2    /4    /8
5     Low      0             1       Strict    1    /2    /4    /8
6     Low      0             1       Strict    1    /2    /4    /8
7     Low      0            <1       Strict    1    /2    /4    /8
8     Low      0             1       Strict    1    /2    /4    /8

Press Ctrl-C to exit or any key to continue!

_
```

Within QoS, the rate limit configurations can be set. You can type **"show qos rate-limit"** in any mode to view its current setting.

```
Console> show qos rate-limit
================================================================================
Rate Limiters Information
================================================================================
Port  Rate Limiter  Shaper
----  ------------  ---------
1          disable    disable
2          disable    disable
3          disable    disable
4          disable    disable
5          disable    disable
6          disable    disable
7          disable    disable
8          disable    disable

Press Ctrl-C to exit or any key to continue!

_
```

Show Currently-Configured Settings

When you type a specific command in Enable or Config mode to configure or edit the setting of a certain function, you can type **"show"** to verify the setting you have just configured or

edited. For example, when you are in Console(console)# and have changed the setting of time-out function, you can type “show” after “Console(console)#” prompt, then you can verify the currently-configured setting of time-out function.

```
Console(console)# time-out 9999
OK !
Console(console)# show
================================================================================
System Time Information : (Configuration changed, still not saved!)
================================================================================
Time Out : 9999

Console(console)#
```

2.3.2.4 Usage Help

When entering a command without the required parameter, the system will remind users of the command’s syntax and parameter.

```
Console# ip
Console(ip)# type
Usage   : type <manual | dhcp>
Example : type manual
Console(ip)# _
```

2.3.2.5 Press Any Key to Continue

When a command generates more than one page outputs, the prompt “Press Ctrl-C to exit or any key to continue!” will be displayed at the bottom of the screen. Simply press any key to view next page information or press Ctrl-C to return to the prompt line.

```
Console> show qos
================================================================================
QoS port Information
================================================================================
Port  Default  Tag Priority  QCL ID  Mode      Weight
----  -------  ------------  ------  --------  --------------------
1     Low      0             1       Strict    1    /2    /4    /8
2     Low      0             1       Strict    1    /2    /4    /8
3     Low      0             1       Strict    1    /2    /4    /8
4     Low      0             1       Strict    1    /2    /4    /8
5     Low      0             1       Strict    1    /2    /4    /8
6     Low      0             1       Strict    1    /2    /4    /8
7     Low      0            <1       Strict    1    /2    /4    /8
8     Low      0             1       Strict    1    /2    /4    /8

Press Ctrl-C to exit or any key to continue!

_
```

2.3.2.6 Conventions

In CLI, some conventions are used consistently to express uses of a parameter. Common conventions are described below.

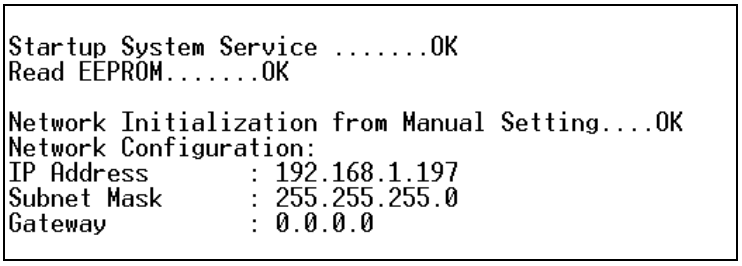
Conventions	Descriptions
< >	Required parameters or values are in angle brackets.
[ ]	Optional parameters or values are in square brackets. For example: [qce_id] or [etype <etype (0x600-FFFF)> | vid <vid(1-4094)> | port <udp_tcp_port(0-65535)> |dscp <dscp(0-63)> | tos <tos_list(0-7)> | tag_prio <tag_prio_list(0-7)>]
<port_list>	"port_list" allows you to enter several discontinuous port number, separating by a comma, for example, port "5, 7, 9, 12"; or, you can enter continuous port numbers with a dash and separating by a comma, for example, port "1-5, 7-9, 12-15."
<enable | disable>	Two options, separated by a vertical bar, are available for selection. Select one option within the angle bracket.
<administrator | read_and_write | read_only | access_denied>	Several options, separated by a vertical bar, are available for selection. Select one option within the angle bracket.
[etype <etype (0x600-FFFF)> | vid <vid(1-4094)> | port <udp_tcp_port(0-65535)> |dscp <dscp(0-63)> | tos <tos_list(0-7)> | tag_prio <tag_prio_list(0-7)>]	This is an optional parameter or value and six parameters are available for selection.

2.4 User mode

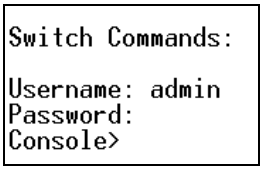
When you use CLI, you will start in the User mode. The User mode provides basic configurations and ping test of the Managed Switch. In User mode, users can assign Switch IP address, mask and gateway.

Access to User mode

When the Managed Switch is turned on, boot-up message will be displayed first and then followed by username and password prompt (Default username is **admin**. No password is required for default setting thus press **Enter** key in password prompt.). When system prompt shows "Console>", it means the user has successfully entered the User mode.

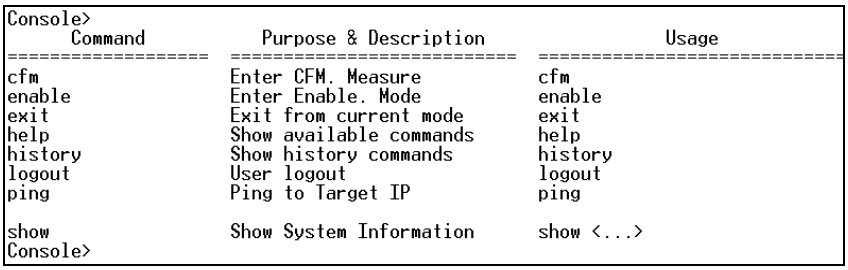


Boot up message



Root directory (Default username: **admin** without password)

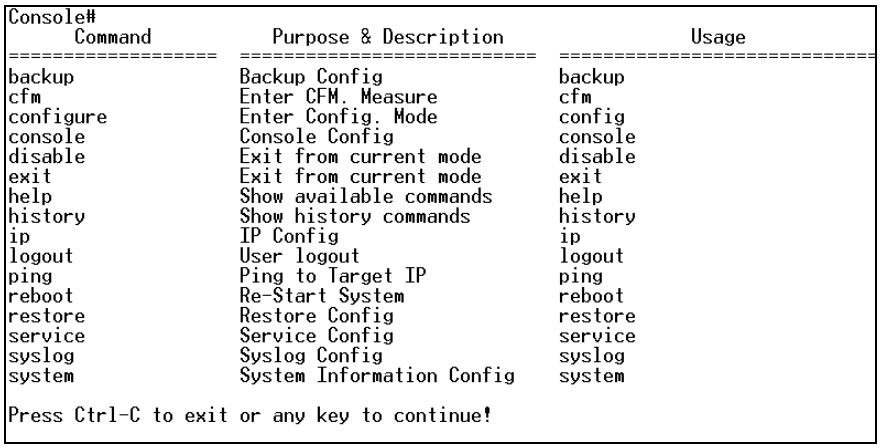
In “Console>”, enter the question mark (?) to show all commands available for User mode. The screen shows as follows:


Console>
Command Purpose & Description Usage
cfm Enter CFM. Measure cfm
enable Enter Enable. Mode enable
exit Exit from current mode exit
help Show available commands help
history Show history commands history
logout User logout logout
ping Ping to Target IP ping
show Show System Information show <...>
Console>

Command	Description
cfm	Run OAM 802.1ag CFM loopback, linktrace, delay measurement test.
enable	Enter the Enable mode.
exit	Leave the User mode.
help	Display a list of available commands in User mode.
history	Display the command history.
logout	Logout from the Managed Switch.
ping	Allow users to ping a specified network device.
show	Show a list of commands or show the current setting of each listed command.

2.5 Enable mode

In order to manage the Managed Switch and set up required switching functions, enter the **enable** command after the “Console>” and then press ? for a list of commands available for use.



```
Console#
      Command          Purpose & Description              Usage
==================  ========================  ============================
backup              Backup Config             backup
cfm                 Enter CFM. Measure        cfm
configure           Enter Config. Mode        config
console             Console Config            console
disable             Exit from current mode    disable
exit                Exit from current mode    exit
help                Show available commands   help
history             Show history commands     history
ip                  IP Config                 ip
logout              User logout               logout
ping                Ping to Target IP         ping
reboot              Re-Start System           reboot
restore             Restore Config            restore
service             Service Config            service
syslog              Syslog Config             syslog
system              System Information Config system

Press Ctrl-C to exit or any key to continue!
```

Command	Description
backup	Backup configuration file via FTP or TFTP.
cfm	Run OAM 802.1ag CFM loopback, linktrace, delay measurement test.
configure	Enter Config mode.
console	Set up time-out time.
disable	Exit Enable mode and return to User Mode.
exit	Exit Enable mode and return to User Mode.
help	Display a list of available commands in Enable mode.
history	Show commands that have been used.
ip	Assign IP addresses manually or automatically.
logout	Logout from the Managed Switch.
ping	Allow users to ping a specified network device.
reboot	Restart the Managed Switch.
restore	Restore configuration via FTP or TFTP.
service	Three different management services are provided to configure the Managed Switch; these are “Telnet”, “SNMP”, and “Web”.
syslog	Configure the Managed Switch’s syslog settings.
system	Configure system information.
time-server	Synchronize the time of a computer client or server to another server.
upgrade	Allow users to update firmware and restore configuration via FTP or TFTP.
user	Set up a user account and its access privilege.
Show	Show a list of commands or show the current setting of each listed command.

2.5.1 Backup command mode

Prompt	Command & Parameter	Description
Console(backup)#	**auto-backup <ftp | tftp><server ip> <username> <password> <file directory> <0-23 o'clock>**	To configure auto-backup settings. The system will backup configuration file.
	auto-backup <enable | disable>	To enable or disable auto-backup function.
	config <ftp | tftp> <server ip> <username> <password> <file directory>	To backup configuration file immediately.

2.5.2 CFM command mode

Ethernet Connectivity Fault Management (CFM) is an end-to-end and service-to-service Ethernet layer operations, administration and maintenance (OAM) 802.1ag protocol. It includes practical connectivity monitoring, fault verification and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.
As its name implies, IEEE 802.1ag focuses on the connectivity fault management which provides the following four features on each Virtual Local Area Network (VLAN) basis.

- **Fault Detection/Fault notification**
- **Fault verification**
- **Fault isolation**

Fault Detection/Fault notification

IEEE 802.1ag supports fault detection through Continuity Check Messages (CCM). CCM is somewhat like the “keep-alive” message. By default, every 802.1ag-capable network device (ND) sends out “heart-beat” style CCM periodically. Hence, by configuring a list of expected existent remote 802.1ag-capable NDs, the local 802.1ag-capable ND can detect the health status of its connection to the remote ND.

Fault verification

IEEE 802.1ag supports fault verification through Loopback Messages (LBM) and Loopback Reply (LBR). The LBM/LBR mechanism is similar to ICMP “ping” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault verification by ICMP “ping” in such a network environment.

Fault isolation

In addition to the LBM/LBR mechanism, IEEE 802.1ag supports fault isolation through Linktrace Messages (LTM) and Linktrace Reply (LTR). The LTM/LTR mechanism is similar to the “trace route” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault isolation by “trace route” in such a network environment.

IEEE 802.1ag also defines the following network error status to be conveyed in the CCM.

MACstatus

Either some remote ND is reporting its interface as not ready to pass both the data packets and BPDU, or all remote NDs are reporting their interfaces as not able to pass ordinary data packets.

RemoteCCM

The ND is not receiving valid CCMs from at least one of the remote NDs.

ErrorCCM

The ND has received at least one invalid CCM whose CCM Interval has not yet timed out.

XconCCM

The ND has received at least one CCM from either another VLAN or a lower MD Level whose CCM Interval has not yet timed out.

Prompt	Command & Parameter	Description
Console(cfm)#	**loopback <domain_name> <assoc_name> <target mepid | mac address>[-n number(2-100)] [-s size(1-255)] [-p priority(0-7)] [-d drop eligible(true|false)]**	Run loopback test. For Example: Console(cfm)#loopback domain assoc 00:01:02:03:04:05 -n 100 -s 255 -p 3 -d true
	linktrace <domain_name> <assoc_name> <target mepid | mac address>[-f flag(fdbonly | none)] [-h hop count(1-255)]	Run linktrace test. For Example: Console(cfm)# linktrace domain assoc 00:01:02:03:04:05 -f none -h 100
	de-measure <domain_name> <assoc_name> <target mepid | mac address>[-n number(2-100)] [-p priority(0-7)]	Run delay measurement test. For Example: Console(cfm)#de-measure domain assoc 00:01:02:03:04:05 -n 100 -p 0

2.5.3 Console command mode

Prompt	Command & Parameter	Description
Console(Console)#	**time-out <secs>**	To disconnect the Managed Switch when the user is inactive. <secs>: 0 or 5-9999 seconds For example: Console(Console)#time-out 300

2.5.4 IP command mode

Prompt	Command & Parameter	Description
Console(ip)#	**type <manual | dhcp>**	If “DHCP” is selected and a DHCP server is also available on the network, the Managed Switch will automatically get the IP address from the DHCP server. If "Manual" mode is selected, the user needs to specify the IP address, Subnet Mask and Gateway. For example: Console(ip)# type manual
	address <ip> <mask> <gw>	Enter the unique IP address of this Managed Switch. You can use the default IP address or specify a new one when address duplication occurs or the address does not match up with your network. (Default IP address is 192.168.0.1) For example: Console(ip)# address 192.110.1.2 Specify the subnet mask to the Switch IP address. The default subnet mask values for the three Internet address classes are as follows: Class A: 255.0.0.0 Class B: 255.255.0.0 Class C: 255.255.255.0 For example:

		Console(ip)# address 192.110.1.2 255.255.255.0 Specify the IP address of a gateway or a router, which is responsible for the delivery of the IP packets sent by the Switch. This address is required when the Switch and the network management station are on different networks or subnets. The default value of this parameter is 0.0.0.0, which means no gateway exists and the network management station and Switch are on the same network. For example: Console(ip)# address 192.110.1.2 255.255.255.0 120.110.1.5

2.5.5 Service command mode

Prompt	Command & Parameter	Description
Console(service-telnet)#	**mode <enable | disable>**	In service command mode, it provides three modes for users to choose from, these are "telnet", "snmp" and "web". If you type "telnet", you can set up whether to enable or disable this mode. For example: Console(service-telnet)#mode enable
	port <telnet_port>	When telnet is enabled, you can set up the port number that allows telnet access. The default port number is set to 23 in telnet mode. However, you can also identify a port number between 1025 and 65535. For example: Console(service-telnet)#port 23
Console(service-snmp)#	**mode <enable | disable>**	In service command mode, it provides three modes for users to choose from, these are "telnet", "snmp" and "web". If you type "snmp", you can set up either to enable or disable this mode. For example: Console(service-snmp)#mode enable
Console(snmp-community)#	**add<community>**	Add a new community. The name of the community is up to 20 alphanumeric characters. For example: Console(snmp-community)#add myswitch
	delete<community>	To delete a community that is already added to the Managed switch. For example: Console(snmp-community)#delete myswitch
Console(snmp-community_*commnity name*)#	**state <enable | disable>**	To enable or disable community function.
	description <description>	Enter a unique description for this community name, up to 35 alphanumeric characters. This is mainly for reference only.
	ip <enable | disable>	To enable or disable IP security. If enabled, Community may access the Managed Switch

		only through the management station, which has the exact IP address specified in IP address field below. If disabled, Community can access the Managed Switch through any management stations.
	ip_addr <ip_addr>	Specify the IP address used for IP Security function.
	level <administrator | read_and_write | read_only | access_denied>	Specify the desired privilege for the SNMP operation. <administrator | read_and_write | read_only | access_denied>: Four operation privileges are available in the Managed Switch. **Administrator:** Full access right includes maintaining user account & system information, loading factory settings, etc. **Read & Write:** Full access right but cannot modify user account & system information and load factory settings. **Read Only:** Allow to view only. **Access Denied:** Completely forbidden for access. ***NOTE 1:*** *When the community browses the Managed Switch without proper access right, the Managed Switch will respond nothing. For example, if a community only has Read & Write privilege, then it cannot browse the Managed Switch's user table.* ***NOTE 2:*** *If you would like to edit the settings of your new account, you can enter the command* ***community community name*** *under the Console(service-snmp)#.* *For example:* *If you want to edit settings of the account "salesdept", you can use the following commands to enter the editing mode.* *Console#service* *Console(service)#snmp* *Console(service-snmp)#community salesdept* *Console(snmp-community_salesdept)#*
Console(snmp-trap-dest)#	**add <trap_id> <trap_ip> <community>**	To add a new trap destination. This function will send trap to the specified destination. <trap_id>: 1~10 <trap_ip>: The specific IP address of the network management system that will receive the trap. <community>: up to 20 characters. ***NOTE:*** *If you would like to edit the settings of a trap destination, you can enter the command* ***trap-dest trap id*** *under the Console(service-*

		snmp)#. *For example:* *If you want to edit settings of the trap destination "2", you can use the following commands to enter the editing mode.* *Console#service* *Console (service)#snmp* *Console (service-snmp)#trap-dest 2* *Console (snmp-trap-dest_2)#*
	delete <trap_id>	To delete a registered trap destination.
Console(snmp-trap-dest_*trap id*)#	**state <enable | disable>**	To enable or disable this trap destination. For example: Console(snmp-trap-dest_*trap id*)#state enable
	destination <ip_addr>	Specify the IP address of this trap destination. **<ip_addr>:** Enter the trap destination IP address.
	community<community>	Enter the community name. **<community>:** Enter the community name of up to 20 characters.
Console(snmp-trap-mode)#	**cold-start <enable | disable>**	To enable or disable the Managed Switch to send a trap when the Managed Switch cold starts.
	warm-start <enable | disable>	To enable or disable the Managed Switch to send a trap when the Managed Switch warm starts.
	auth-fail <enable | disable>	To enable or disable the Managed Switch to send authentication failure trap when any unauthorized users attempt to login.
	port-link <enable | disable>	To enable or disable the Managed Switch to send port Link Up/Down trap.
	storm <enable | disable>	To enable or disable broadcast storm trap sending from the Managed Switch when broadcast packets reach the upper limit.
	upper-limit <packets/secs>	The broadcast storm trap will be sent when the Managed Switch exceeds the specified limit. <packets/secs>: 0~148810
	power-down <enable | disable>	Send a trap notice while the Managed Switch is power down.
	case-fan <enable | disable>	To enable or disable the Managed Switch to send a trap when fan is not working or failed.
	sfp <enable | disable>	To enable or disable the Managed Switch to send SFP abnormality trap.
	all <enable | disable> **Example : all enable**	To set up all situations above as enabled or disabled.
Console(service-web)#	**mode <enable | disable>**	To enable or disable web management.

2.5.6 Syslog command mode

Prompt	Command & Parameter	Description
Console(syslog)#	**mode <enable | disable>**	To enable or disable syslog.
	server-1 <ip_addr1>	Set up the first syslog server IP.
	server-2 <ip_addr2>	Set up the second syslog server IP.
	server-3 <ip_addr3>	Set up the third syslog server IP.

2.5.7 System command mode

Prompt	Command & Parameter	Description
Console(system)#	**company <company_name>**	Specify a company name of up to 55 alphanumeric characters.
	syscontact <system_contact>	Enter contact information for this Managed switch, up to 55 alphanumeric characters.
	sysname <system_name>	Enter a unique name for this Managed Switch, up to 55 alphanumeric characters. Use a descriptive name to identify the Managed Switch in relation to your network, for example, “Backbone 1”. This name is mainly used for reference only.
	syslocation <system_location>	Enter a brief description of the Managed Switch location, up to 55 alphanumeric characters. As the name implies, the location is for reference only, for example, “13th Floor”.

2.5.8 Time-server command mode

Prompt	Command & Parameter	Description
Console(time-server)#	**mode <enable | disable>**	To enable or disable time-server.
	ip-addr <ip_addr> [test]	Enter the NTP time server IP address.
	2nd-addr <2nd_addr> [test]	Enter the second NTP time server IP address.
	syninterval <minutes>	The interval time to synchronize from NTP time server. <minutes>: 1~99999 minutes For example: Console(time-server)#syninterval 50
	time-zone<number>	Select the appropriate time zone from the list provided.
	day-saving <enable | disable>	To enable or disable the daylight saving time function.
	offset <hour>	To offset 1 hour or 2 hours for daylight saving function.

2.5.9 Upgrade command mode

Prompt	Command & Parameter	Description
Console(upgrade)#	**firmware <ftp|tftp> <serverip> <username> <password> <filelocation>**	To upgrade Firmware via FTP or TFTP. <serverip>: Enter the IP address of the

		FTP or TFTP server. <username>: Enter the username for Firmware upgrade via FTP. If you use TFTP server to upgrade Firmware, you do not need to specify username. <password>: Enter the password for Firmware upgrade via FTP. If you use TFTP server to upgrade Firmware, you do not need to specify password. <filelocation>: Enter the file location within the FTP or TFTP server.
	config <ftp|tftp> <serverip> <username> <password> <filelocation>	To restore configuration via FTP or TFTP server. <serverip>: Enter the IP address of the FTP or TFTP server. <username>: Enter the username for Firmware upgrade via FTP. If you use TFTP server to upgrade Firmware, you do not need to specify username. <password>: Enter the password for Firmware upgrade via FTP. If you use TFTP server to upgrade Firmware, you do not need to specify password. <filelocation>: Enter the file location within the FTP or TFTP server.

2.5.10 User command mode

Command	Parameter	Description
Console(user)#	**add <username> [password] <administrator | read_and_write | read_only | access_denied>**	Add a new user and specify its access privilege. <administrator | read_and_write | read_only | access_denied>: Four operation privileges are available in the Managed Switch. **Administrator:** Full access right includes maintaining user account & system information, loading factory settings, etc. **Read & Write:** Full access right but cannot modify user account & system information and load factory settings. **Read Only:** Allow to view only. **Access Denied:** Completely forbidden for access. For example: Console(user)#add user1 user1 administrator
	delete <username>	Delete a registered user. For example: Console(user)#delete user1
Console(user-radius)#	**mode <enable | disable>**	To enable or disable RADIUS Authentication.

	secret <secret>	The word or characters to encrypt data sent to RADIUS server. The word or characters are up to 31 characters.
	port <port>	The RADIUS service port on RADIUS server. <port>: The port number is between 1025 and 65535. For example: Console(user-radius)#port 1812
	retry-time <retry_time>	The number of trying to reconnect if the RADISU server is not reachable. <retry_time>: 0~2 For example: Console(user-radius)#retry-time 2
	ip-addr <ip_addr>	IP address of the first RADIUS server.
	2nd-addr <ip_addr>	IP address of the second RADIUS server.

2.6 Config mode

In order to manage the Managed Switch and set up advanced switching functions, enter the configure command from Console# directory and then type in "?". Then, the screen shows as follows:

```
Console(config)#
      Command           Purpose & Description              Usage
==================  ========================  ============================
aggr                Enter Aggr Cmd. Mode      aggr
cfm                 Enter CFM Cmd. Mode       cfm
dot1x               Enter Dot1x Cmd. Mode     dot1x
exit                Exit from current mode    exit
help                Show available commands   help
history             Show history commands     history
igmpfilter          Enter IGMP Filter Cmd. Mode igmpfilter
igmp                Enter IGMP Cmd. Mode      igmp
mac                 Enter MAC Cmd. Mode       mac
mirror              Enter Mirror Cmd. Mode    mirror
mvr                 Enter MVR Cmd. Mode       mvr <vid>
port                Set Port Cmd.             port <all|port_list>
qos                 Enter QoS Cmd. Mode       qos
rstp                Enter RSTP Cmd. Mode      rstp
ska                 Enter SKA Cmd. Mode       ska
multicast           Enter Multicast Cmd. Mode multicast

Press Ctrl-C to exit or any key to continue!

_

switch              Enter Switch Cmd. Mode    switch
vlan                Enter VLAN Cmd. Mode      vlan

show                Show current settings     show <...>
Console(config)# _
```

Command	Description
aggr	Configure LACP functions.
cfm	Configure the Managed Switch OAM 802.1ag CFM settings.
dot1x	Configure the Managed Switch to send information when 802.1x client authenticates via the Switch.
exit	Exit the config mode.
help	Display a list of available commands in Config mode.
history	Show commands that have been used.
igmpfilter	Configure IGMP filtering settings.
igmp	Configure IGMP settings.
mac	Set up each port's MAC learning function.
mirror	Set up target port for mirroring.

mvr	Configure Multicast VLAN Registration (MVR) settings.
port	Configure the status of each port.
qos	Set up the priority of packets within the Managed Switch.
rstp	Set up each port and aggregated ports' RSTP status.
ska	Configure Secure Customer Connections (SKA) settings.
multicast	Configure static multicast settings.
switch	Set up acceptable frame size and address learning, etc.
vlan	Set up VLAN mode and VLAN configuration.
show	Show a list of commands or show the current setting of each listed command.

2.6.1 Aggr command mode

Link aggregation is an inexpensive way to set up a high-speed backbone network that transfers much more data than any one single port or device can deliver without replacing everything and buying new hardware.

For most backbone installations, it is common to install more cabling or fiber optic pairs than initially necessary, even if there is no immediate need for the additional cabling. This action is taken because labor costs are higher than the cost of the cable and running extra cable reduces future labor costs if networking needs changes. Link aggregation can allow the use of these extra cables to increase backbone speeds with little or no extra cost if ports are available.

This Managed switch supports 2 link aggregation modes: static **Port Trunk** and dynamic **Link Aggregation Control Protocol (LACP)** using the IEEE 802.3ad standard. These allow several devices to communicate simultaneously at their full single-port speed while not allowing any one single device to occupy all available backbone capacities.

Prompt	Command & Parameter	Description
Console(config-aggr)#	**add <port_list> <aggr_id>**	The Managed Switch allows users to create 13 trunking groups. Each group consists of 2 to 16 links (ports). <port_list>: 1~26 <aggr_id>:1~13 For example: Console(config-aggr)#add 1-4,10-15,19 10
	delete <aggr_id>	Delete an aggregation ID. <aggr_id>:1~13 For example: Console(config-aggr)#delete 10
	mode <smac | dmac> <enable | disable>	Enable or disable packets according to source and destination MAC address For example: Console(config-aggr)#mode dmac enable
Console(config-aggr-lacp)#	**state <port_list> <enable | disable>**	This Managed Switch allows users to indicate which port(s) are enabled to use LACP. For example: Console(config-aggr-lacp)# state 1-4,10-15,18,19 enable

	key <port_list> <key>	Specify the key value to the selected ports. <port_list>: 1~26 <key>: The range of key value is from 0 to 255. For example: Console(config-aggr-lacp)# key 1-4,10-15,18,19 200
	role <port_list> <active | passive>	To set up whether LACP ports are active or passive. <port_list>: 1~26 <active | passive>: **Active** LACP ports are capable of processing and sending LACP control frames. This allows LACP compliant devices to negotiate the aggregated link so that the group may be changed dynamically as required. In order to utilize the ability to change an aggregated port group, that is, to add or remove ports from the group, at least one of the participating devices must designate LACP ports as active. Both devices must support LACP. LACP ports that are designated as **passive** cannot initially send LACP control frames. In order to allow the linked port group to negotiate adjustments and make changes dynamically, one end of the connection must have “active” LACP ports. For example: Console(config-aggr-lacp)# role 1-4,10-15,18,19 active

2.6.2 CFM command mode

Prompt	Command & Parameter	Description
Console(config-cfm-dom)#	**add <domain_name> <level> <mhf>**	This allows the user to register a CFM maintenance domain. <domain_name>: up to 22 characters. <level>: 0~7 <mhf>: Specify MHF as “default” “explicit” or “none”. **Default:** MHFs can be created for this VID on any Bridge Port through which the VID can pass. **Explicit:** MHFs can be created on CFM VLAN member port and only if there is a MEP at the lower active MD-level on the port. **None:** No MHFs can be created for this VID. For example: Console(config-cfm-dom)#add mydomain 7 none
	delete <domain_name>	To delete a registered domain name.

		For example: Console(config-cfm-dom)#delete mydomain
Console(config-cfm-dom_*domain name*)#	**level <level>**	To specify maintenance domain level for the registered domain name. <level>: 0~7 For example: Console(config-cfm-dom_mymy)#level 7
	mhf <default | explicit | none>	To specify MHF for the registered domain name. <default | explicit | none>: Three options are available for this function. **Default:** MHFs can be created for this VID on any Bridge Port through which the VID can pass. **Explicit:** MHFs can be created on CFM VLAN member port and only if there is a MEP at the lower active MD-level on the port. **None:** No MHFs can be created for this VID. For example: Console(config-cfm-dom_mymy)#mhf none ***NOTE:*** *If you would like to edit the settings of your new domain, you can enter the command* ***domain domain name*** *under the Console(config-cfm)#.* *For example:* *If you want to edit settings of the account "mydomain", you can use the following commands to enter the editing mode.* *Console(config-cfm)#domain mydomain* *Console(snmp-community_mydomain)#*
Console(config-cfm-assoc)#	**add <assoc_name> <vlan_id> <ccm_interval> <mhf>**	This allows users to register a maintenance association. <assoc_name>: up to 20 characters. <vlan_id>: 0 (None);1~4094 <ccm_interval>: 0:no 1:1s 2:10s 3:1m 4:10m <mhf>: Four options are available for this function. **Defer:** The control of MHF creation is deferred to the corresponding variable in the enclosing Maintenance Domain. **Default:** MHFs can be created for this VID on any Bridge Port through which the VID can pass. **Explicit:** MHFs can be created on CFM VLAN member port, and only if there is a MEP at the

		lower active MD-level on the port. **None:** No MHFs can be created for this VID. For example: Console(config-cfm-assoc)#add myassoc 1 4 none
	delete <assoc_name>	To delete a registered association name. For example: Console(config-cfm-assoc)#delete myassoc
Console(config-cfm)#	**loopback <target mepid | mac_address>[-n number(2-100)] [-s size(1-255)] [-p priority(0-7)] [-d drop_eligible(true | false)]**	To configure loopback test settings. For Example: Console(cfm)#loopback domain assoc 00:01:02:03:04:05 -n 100 -s 255 -p 3 -d true
	linktrace <target mepid | mac_address> [-f flag(fdbonly | none)][-h hop_count(1-255)]	To configure linktrace settings. For Example: Console(cfm)# linktrace domain assoc 00:01:02:03:04:05 -f none -h 100
	de-measure <target mepid | mac_address> [-n number(2-100)] [-p priority(0-7)]	To configure delay measurement settings. For Example: Console(cfm)#de-measure domain assoc 00:01:02:03:04:05 -n 100 -p 0

2.6.3 Dot1x command mode

Prompt	Command & Parameter	Description
Console(config-dot1x-sys)#	**mode <enable | disable>**	To enable or disable 802.1X for the Managed Switch.
	server <ip_addr>	RADIUS Authentication server address.
	secret <shared_secret>	The identification word or number assigned to each RADIUS authentication server with which the client shares a secret. <shared_secret>: up to 30 characters
	reauth <enable | disable>	To enable or disable Reauthentication.
	period <reauth_period>	The time interval that the system sends out periodic reauthentication message. <reauth_period>: 0~3600 Seconds
	eap-timeout <eapol_timeout>	The time that the Managed Switch waits for responses from the server host to an authentication request. <eapol_timeout>: 1~255 Seconds
Console(config-dot1x)#	**state <port_list> <auto | authorized | unauthorized>**	Specify each port's authentication statue. <auto | authorized | unauthorized>: **Authorized:** This forces the port to grant access to all clients, either dot1x-aware or otherwise. "Authorized" is the default setting. **Unauthorized:** This forces the port to deny access to all clients, either dot1x-aware or otherwise.

		Auto: This requires a dot1x-aware client to be authorized by the authentication server. Accesses from clients that are not dot1x-aware will be denied. For example: Console(config-dot1x)#state 1-4,10-15,18,19 auto
	authentic <port_list>	This will automatically send out authentication message to selected clients. <port_list>: 1~26 For example: Console(config-dot1x)#authentic 1-4,10-15,18,19

2.6.4 IGMP filter command mode

Prompt	Command & Parameter	Description
Console(config-segment)#	**add <seg_id> <seg_name> <ip> <ip>**	To create a segment. <seg_id>: 1~400 <seg_name>: up to 20 characters <ip>: The IP range is from 224.0.1.0~238.255.255.255 For example: Console(config-segment)# add 2 myseg 224.0.1.5 235.255.255.253
	delete <seg_id>	To delete a registered segment.
Console(config-profile)#	**add <profile_name> <seg_id> <seg_id> ….**	To create a profile. <profile_name>: up to 20 characters <seg_id>: 1~400 (The field for segment ID is from the entry registered in **Segment** option.) For Example: Console(config-profile)#add myprofile 2
	delete <profile_name>	To delete a registered profile.
Console(config-igmpfilter)#	**mode <enable | disable>**	To enable or disable IGMP filtering
	channel <port_list> <1-10>	Specify the maximum transport multicast stream. <port_list>: 1~26 <1-10>: Channel limit from 1 to 10 For example: Console(config-igmpfilter)# channel 1-4,10-15,18,19 10
	state <port_list> <enable | disable>	To enable or disable each port's IGMP filtering function. <port_list>: 1~26 For example: Console(config-igmpfilter)# state 1-4 enable

	filter <port_list> <profile_name> <profile_name>…	This allows information of specified IPMC Profile to pass-through. <port_list>: 1~26 <profile_name> This field for IPMC Profile name is from the entry registered in IPMC Profile option. For example: Console(config-igmpfilter)# filter 1-4 mypro

2.6.5 IGMP command mode

Prompt	Command & Parameter	Description
Console(config-igmp)#	**mode <enable | disable>**	To enable or disable IGMP function.
	router-port <port_list>	To set up which ports belong to router ports <port_list>: 1~26 For example: Console(config-igmp)# router-port 1-4,10-15,18,19
	flooding <enable | disable>	Set forwarding mode for unregistered (not-joined) IP multicast traffic. The traffic will flood when enabled. However, the traffic will forward to router-ports only when disabled.
	vlanstate <vid> <enable | disable>	When enabled, the port in VLAN will monitor network traffic and determine which hosts want to receive the multicast traffic. <vid>: 1~4094 For example: Console(config-igmp)#vlanstate 1 enable
	vlanquerier <vid> <enable | disable>	When enabled, the port in VLAN can serve as the Querier which is responsible for asking hosts whether they want to receive multicast traffic. <vid>: 1~4094 For example: Console(config-igmp)#vlanquerier 1 enable
	interval <num>	The Query Interval is used to set the time between transmitting IGMP queries. <num>:1~6000 Seconds
	maxresponse <num>	This determines the maximum amount of time allowed before sending an IGMP response report. <num>: 1~6000(1/10Secs)
	fast-leave <enable | disable>	The Fast Leave option may be enabled or disabled. This allows an interface to be ignored without sending group-specific queries.

2.6.6 MAC command mode

Prompt	Command & Parameter	Description

Console(config-mac)#	**learning <port_list> <auto | disable>**	To set up each port's MAC learning function. <port_list>: 1~26 For example: Console(config-mac)# learning 1-4,10-15,18,19 auto
Console(config-mac-static)#	**add <mac-addr> <vlan_id> <port | filter>**	Specify a destination MAC address in the packet and the VLAN where the packets with the Destination MAC address can be forwarded. <vlan_id>: 1~4094 <port | filter>: port:1~26 filter:27
	delete <mac-addr> <vlan_id> <port | filter>	Delete a MAC address setting.

2.6.7 Mirror command mode

Prompt	Command & Parameter	Description
Console(config-mirror)#	**port <mirror_port_list>**	To enable or disable Target Port's mirroring on the TX and RX of Source port. <mirror_port_list>: 1~26 For example: Console(config-mirror)# port 1-4,10-15,18,19
	Target-port <target_port | disable>	Specify the preferred target port for mirroring. <target_port>: 1~26 or 0 (disabled) For example: Console(config-mirror)#target-port 24

2.6.8 MVR command mode

MVR refers to Multicast VLAN Registration that enables a media server to transmit multicast stream in a single multicast VLAN when clients receiving multicast VLAN stream can reside in different VLANs. Clients in different VLANs intend to join or leave the multicast group simply by sending the IGMP Join or Leave message to a receiver port. The receiver port that belongs to one of the multicast groups can receive multicast stream from the media server.

MVR Configuration Guidelines and Limitations

Guidelines:

- Enable IGMP global setting.
- Enable MVR global setting.
- Create MVR VLAN and indicate the Source port and Receive port.
- Create MVR Groups whose multicasting channels would belong to MVR VLAN.
- Enable VLAN Aware in MVR Source Port. In a normal condition, Tag multicasting stream injects to Source port. (Optional)

- Setting VLAN Port Egress mode in MVR Receive port. In a normal condition, Un-tag multicasting stream forward to receive port. (Optional)

Limitation

- Receiver ports on a switch can be in different VLANs, but they should not belong to the multicast VLAN.
- Do not configure MVR on private VLAN ports.
- MVR can coexist with IGMP snooping on a switch.
- MVR data received on an MVR receiver port is not forwarded to MVR source ports.
- MVR does not support IGMPv3 messages.
- MVR on IPv6 multicast groups is not supported.

Prompt	Command & Parameter	Description
Console(config-mvr)#	**mode <enable | disable>**	To enable or disable MVR global setting
	add <vlan_id> <rec_port_list> <sor_port_list>	To add a MVR VLAN ID and specify its Receive and Source Port. <vlan_id>: 1~4094 <rec_port_list>: 1~26 <sor_port_list>: 1~26 For example: Console(config-mvr)#add 4094 1-4,10-15,18,19 5-9,16,17
	delete <vlan_id>	To delete a registered MVR VLAN ID. <vlan_id>: 1~4094 For example: Console(config-mvr)#delete 4094
Console(config-mvr-group)#	**add <vlan_id> <ip> <ip>**	To add a new MVR group and specify the multicasting channel that would belong to MVR VLAN. <vlan_id>: 1~4094 <ip>: Specify the group range 224.0.1.0~238.255.255.255 For example: Console(config-mvr-group)# add 4094 224.0.1.0 238.255.255.255
	delete <vlan_id> <ip> <ip>	To delete a registered MVR group. <vlan_id>: 1~4094 <ip>: Specify the group range 224.0.1.0~238.255.255.255 For example: Console(config-mvr-group)#delete 4094 224.0.1.0 238.255.255.255

2.6.9 Port command mode

Prompt	Command & Parameter	Description
Console(config)#	**port <all | port_list> state <enable | disable>** **port <all | port_list> media <copper | fiber>** **port <all | port_list> type <manual | auto-negotiation>** **port <all | port_list> speed <1000 | 100 | 10>** **port <all | port_list> duplex <full | half>** **port <all | port_list> flow-control <enable | disable>**	**Port State:** Enable or disable the current port state. **Preferred Media Type:** Specify copper or fiber as the preferred media type. **Port Type:** Select Auto-Negotiation or Manual mode as the port type. **Port Speed:** When you select Manual port type, you can further specify the transmission speed (10Mbps/100Mbps/1000Mbps) of the port(s). **Duplex:** When you select Manual port type, you can further specify the current operation Duplex mode (full or half duplex) of the port(s). **Flow Control:** Enable or disable the flow control. **For example:** Console(config)#port all state enable

2.6.10 QoS command mode

Network traffic is always unpredictable and the only basic assurance that can be offered is the best effort traffic delivery. To overcome this challenge, Quality of Service (QoS) is applied throughout the network. This ensures that network traffic is prioritized according to specified criteria and receives preferential treatments.

QoS enables you to assign various grades of network service to different types of traffic, such as multi-media, video, protocol-specific, time critical, and file-backup traffic.

Prompt	Command & Parameter	Description
Console(config-qos-qcl)#	**add <qcl_id(1-26)> [etype <etype (0x600-FFFF)> | vid <vid(1-4094)> | port <udp_tcp_port(0-65535)> | dscp <dscp(0-63)> | tos <tos_list(0-7)> | tag_prio <tag_prio_list(0-7)>] <high | medium | normal | low>**	To add a QoS control list. <qcl_id(1-26)>: 1~26 [etype <etype (0x600-FFFF)> | vid <vid(1-4094)> | port <udp_tcp_port(0-65535)> | dscp <dscp(0-63)> | tos <tos_list(0-7)> | tag_prio <tag_prio_list(0-7)>]: This command and parameter is optional. **etype<etype(0x600-FFFF)>:** Specify the ether type for this QoS rule betwee 0x600 and FFFF. **vid <vid(1-4094)>:** Specify the VID to this QoS rule. **port <udp_tcp_port(0-65535)>:** Specify the

		UDP or TCP port number between 0~65535. **dscp <dscp0-63)>:** Specify a DSCP value between 0 and 63. **tos <tos_list(0-7)>:** Specify a TOS priority value from 0~7. **tag_prio <tag_prio_list(0-7)>:** Specify a tag priority value between 0 and 7. <high | medium | normal | low>: Specify one priority level to classify data packets. For example: Console(config-qos-qcl)# add 10 etype 0x700 high
	delete <qcl_id> [qce_id]	To delete a QoS control list. <qcl_id>: 1~26 [qce_id]: Enter a QCE number (optional). For example: Console(config-qos-qcl)#delete 2 10
	port <port_list> <qcl_id>	<port_list>: 1~26 <qcl_id>: 1~26 **For example:** Console(config-qos-qcl)#port 1-7,14,21 5
Console(config-qos)#	**class <port_list> <high | medium | normal | low>**	To configure default class of each port. <port_list>: 1~26 <high | medium | normal | low>: Specify one priority level to classify data packets. For example: Console(config-qos)#class 1-5,10 high
	tagpriority <port_list> <tag_priority>	To configure tag priority. <port_list> : 1~26 <tag_priority>: 0~7 For example: Console(config-qos)# tagpriority 1-5,10 7
	mode <port_list> <strict | weighted>	To specify “strict” or “weighted” to ports. <port_list>: 1~26 <strict | weighted>: “**Strict**” indicates that services to the egress queues are offered in the sequential order and all traffic with higher priority queues are transmitted first before lower priority queues are serviced. “**Weighted**” Round-Robin shares bandwidth at the egress ports by using scheduling weights 1, 2, 4, 8 for queues 1 through 4 respectively. For example: Console(config-qos)# mode 1-4,8,10 strict

	weight <port_list> <weight>	To specify queuing weights for ports that are set up as weighted. <port_list>: 1~26 <weight>: 1, 2, 4, 8 for queues 1 through 4 respectively. For example: Console(config-qos)# weight 2-5,10,12 1:2:4:8
Console(config-qos-rate-limit)#	**ingress <port_list> <bit_rate>**	To enable or disable ingress filter and specify the bit rate of selected ports. <port_list>: 1~26 <bit_rate>: 500-1000000 KBits/Sec, 0 is disabled For example: Console(config-qos-rate-limit)#ingress 3-6,15,20 1500
	egress <port_list> <bit_rate>	To enable or disable engress filter and specify the bit rate of selected ports. <port_list>: 1~26 <bit_rate>: 500-1000000 KBits/Sec, 0 is disabled For example: Console(config-qos-rate-limit)#egress 3-6,15,20 2500
Console(config-qos-storm)#	**unicast <packet_rate>**	To set up unicast packet rate. <packet_rate>: disable, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1k, 2k, 4k, 8k, 16k, 32k, 64k, 128k, 256k, 512k, 1024k For example: Console(config-qos-storm)#unicast disable
	multicast <packet_rate>	To set up multicast packet rate. <packet_rate>: disable, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1k, 2k, 4k, 8k, 16k, 32k, 64k, 128k, 256k, 512k, 1024k For example: Console(config-qos-storm)#multicast disable
	broadcast <packet_rate>	To set up broadcast packet rate. <packet_rate>: disable, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1k, 2k, 4k, 8k, 16k, 32k, 64k, 128k, 256k, 512k, 1024k For example: Console(config-qos-storm)#broadcast disable

2.6.11 RSTP command mode

Prompt	Command & Parameter	Description
Console(config-rstp-sys)#	**sys-prio <sys_prio>**	Each interface is associated with a port (number) in the STP code. And, each switch has a relative priority and cost that is used to decide what the shortest path is to forward a packet. The lowest cost path is always used unless the other path is down. If you have multiple bridges and interfaces then you may need to adjust the priorities to achieve optimized performance. The Managed Switch with the lowest priority will be selected as the root bridge. The root bridge is the "central" bridge in the spanning tree. <sys_prio>: 0:0 1:4096 2:8192 3:12288 4:16384 5:20480 6:24576 7:28672 8:32768 9:36864 10:40960 11:45056 12:49152 13:53248 14:57344 15:61440 For example: Console(config-rstp-sys)#sys-prio 1
	max-age <max_age>	Max Age setting of the Managed Switch in a specific VLAN. <max_age>: 6~200 Seconds For example: Console(config-rstp-sys)#max-age 20
	hello-time <hello_time>	Hello Time setting of the Managed Switch in a specific VLAN. <hello_time>: 1~10 Seconds For example: Console(config-rstp-sys)#hello-time 2
	delay <forward_delay>	The Managed Switch's setting of Forward Delay Time in a specific VLAN. <forward_delay>: 4~30 Seconds For example: Console(config-rstp-sys)#delay 15
	version <compatible | normal>	Specify the RSTP protocol to be used. <compatible | normal>: Normal - use RSTP, Compatible - compatible with STP. For example: Console(config-rstp-sys)#version normal
Console(config-rstp)#	**state <port_list> <enable | disable>**	To enable or disable each port's RSTP state. <port_list>: 1~26 For example: Console(config-rstp)# state 1-4,10-15,19 enable
	path-cost <port_list> <path_cost>	To specify each port's path cost.

		<port_list>: 1~26 <path_cost>: 0~200000000 For example: Console(config-rstp)# path-cost 1-4,10-15,18,19 100000
	priority <port_list> <priority>	To specify each port's priority. <port_list>: 1~26 <priority>: 0:0 1:16 2:32 3:48 4:64 5:80 6:96 7:112 8:128 9:144 10:160 11:176 12:192 13:208 14:224 15:240 For example: Console(config-rstp)# priority 1-4,10-15,18,19 8
	edge <port_list> <enable | disable>	To enable or disable port edge. <port_list>: 1~26 For example: Console(config-rstp)# edge 1-4,10-15,18,19 enable
	p2p <port_list> <forced_true | forced_false | auto>	<port_list>: 1~26 <forced_true | forced_false | auto>: When "forced_true" is selected, p2p ports will be forced to turn on. Ports set as "Forced_false" will be forced to turn off. "Auto" will detect the status automatically. For example: Console(config-rstp)# p2p 1-4,10-15,18,19 forced_true
Console(config-rstp-aggr)#	**state <enable | disable>**	To enable or disable RSTP state of aggregated ports.
	path-cost <path_cost>	To specify aggregated ports' path cost. <path_cost>: 0~200000000 For example: Console(config-rstp-aggr)# path-cost 100000
	priority <priority>	To specify aggregated ports' priority. <priority> : 0:0 1:16 2:32 3:48 4:64 5:80 6:96 7 112 8:128 9:144 10:160 11:176 12:192 13:208 14:224 15:240 For example: Console(config-rstp-aggr)#priority 8
	edge <enable | disable>	To enable or disable port edge.
	p2p <forced_true | forced_false | auto>	<forced_true | forced_false | auto>: When "forced_true" is selected, p2p ports will be forced to turn on. Ports set as "Forced_false" will be forced to turn off. "Auto" will detect the status automatically.

2.6.12 SKA command mode

SKA refers to Secure Customer Connections. In this menu, it provides DHCP snooping, DHCP option 82, DHCP layer 2 relay and customer port (Port number 1~22) filtering functions.

DHCP Option 82 Guidelines

The Managed Switch can add information about the source of client DHCP requests that relay to DHCP server by adding Relay Agent Information. This helps provide authentication about the source of the requests. The DHCP server can then provide an IP address based on this information. The feature of DHCP Relay Agent Information adds Agent Information field to the Option 82 field that is in the DHCP headers of client DHCP request frames.

Guidelines:

- Enable DHCP Option 82 Relay Agent global setting.
- Create Option 82 and trust port setting.
- Create Static IP table for authorized IP address.
- Each port's (Port Number 1~22) configuration for DHCP, Static IP or Unlimited.

Prompt	Command & Parameter	Description
Console(config-ska-opt82)#	**mode <enable | disable>**	To enable or disable DHCP Opt 82 Relay Agent Global setting.
	port <port_list>	<port_list>: 1~24 For example: Console(config-ska-opt82)#port 1-4,10-15,18,19
	trust-port <port_list>	When Trust Port is set to "enabled", a.it will receive packets with Agent information and the Managed Switch will forward them. b.it will receive packets without Agent information and the Managed Switch will add Agent information. When Trust port is set to disabled, a.it receives packets with Agent information and the Managed Switch will drop them. b.it receives packets without Agent information and the Managed Switch will add Agent information. <port_list>: 1~24 For example: Console(config-ska-opt82)# trust-port 1-4,10-15,18,19
Console(config-ska)#	**sourceguard <port_list> <unlimited | dhcp | fix-ip>**	To specify authorized access information for each port.

		<port_list> 1~24 <unlimited | dhcp | fix-ip>: **Unlimited:** Non-Limited (Static IP or DHCP assigns IP). **Fixed IP:** Only Static IP (Create Static IP table first). **DHCP:** DHCP server assigns IP address. For example: Console(config-ska)#sourceguard 1-4,10-15,18,19 dhcp
Console(config-ska-snooping)#	**mode <enable | disable>**	To enable or disable snooping.
	initiated <number>	To specify time that packets might be received. <number>: 0~9999 Seconds For example: Console(config-ska-snooping)#initiated 4
	leased <number>	To specify expired time of packets. <number>: 180-259200 Second For example: Console(config-ska-snooping)#leased 86400
Console(config-ska)#	**isolation <enable | disable>**	If port isolation is set to enable, the customer port (port 1~24) can't communicate to each other.
	ipv6-filter <enable | disable>	To enable or disable ipv6 filter.
	upnp-filter <enable | disable>	To enable or disable upnp filter.
Console(config-ska-static-ip)#	**add <ip> <mask> <vlan_ip> <port>**	Add a static IP. <vlan_ip>: 1~4094 <port>: 1~24
	delete <ip> <mask> <vlan_ip> <port>	Delete a static IP. <vlan_ip>: 1~4094 <port>: 1~24

2.6.13 Multicast command mode

Prompt	Command & Parameter	Description
Console(config-multicast)#	**add <ip-addr> <vlan_id> <port>**	To add and configure a new static multicast. <ip-addr>: 224.0.1.0~238.255.255.255 <vlan_id>: 1~4094 <port>: 1~26 For example: Console(config-multicast)# add 224.0.1.0 4094 24
	delete <ip-addr> <vlan_id> <port>	To delete a registered static multicast. <ip-addr>: 224.0.1.0~238.255.255.255 <vlan_id>: 1~4094 <port>: 1~26

		For example: Console(config-multicast)# delete 224.0.1.0 4094 24

2.6.14 Switch command mode

Prompt	Command & Parameter	Description
Console(config-switch)#	**max-frame <num>**	Specify the maximum frame size between 1518 and 9600 bytes. The default maximum frame size is 9600bytes For example: Console(config-switch)#max-frame 9600
	mac-aging <aging_time>	Specify MAC Address aging time between 0 and 4080 seconds. For example: Console(config-switch)#mac-aging 300
Console(config-switch-sfp)#	**temperature <num> <num>**	The Slide-in SFP module operation temperature. <num>: (-9999)-99999 For example: Console(config-switch-sfp)# temperature 0 70
	voltage <num> <num>	The Slide-in SFP module operation voltage. <num>: (-9999)-99999 For example: Console(config-switch-sfp)#voltage 3 3.6
	tx-bias <num>	The Slide-in SFP module operation current. <num>: (-9999)-99999 For example: Console(config-switch-sfp)# tx-bias 400

2.6.15 VLAN command mode

A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLAN can be used to combine any collections of LAN segments into a group that appears as a single LAN. VLAN also logically segments the network into different broadcast domains. All broadcast, multicast, and unknown packets entering the Switch on a particular VLAN will only be forwarded to the stations or ports that are members of that VLAN.

VLAN can enhance performance by conserving bandwidth and improve security by limiting traffic to specific domains. A VLAN is a collection of end nodes grouped by logics instead of physical locations. End nodes that frequently communicate with each other are assigned to the same VLAN, no matter where they are physically located on the network. Another benefit of VLAN is that you can change the network topology without physically moving stations or changing cable connections. Stations can be 'moved' to another VLAN and thus communicate with its members and share its resources, simply by changing the port VLAN

settings from one VLAN to another. This allows VLAN to accommodate network moves, changes and additions with the greatest flexibility.

Prompt	Command & Parameter	Description
Console(config-vlan-port-base)#	**add <port_list> <name>**	Add a new port-based VLAN. <port_list>: 1~26 <name>: up to 15 characters For example: Console(config-vlan-port-base)#add 2 myvlan
	delete <name>	Delete a registered port-based VLAN. <name>: up to 15 characters For example: Console(config-vlan-port-base)#delete myvland
Console(config-vlan-dot1q)#	**add <vid> <port_list> [name]**	To add a new VLAN entity. <vid>: 1~4094 <port_list>: 1~26; 27:CPU [name]: up to 15 characters For example: Console(config-vlan-dot1q)#add 1 2 myvlan
	delete <vid>	To delete a registered VLAN. For example: Console(config-vlan-dot1q)#delete 1
Console(config-vlan)#	**aware <port_list> <enable | disable>**	To enable or disable VLAN aware. <port_list>: 1~26 For example: Console(config-vlan)# aware 1-4,10-15,18,19 enable
	filter <port_list> <enable | disable>	To enable or disable ingress filter. <port_list>: 1~26 For example: Console(config-vlan)# filter 1-4,10-15,18,19 enable
	frame-type <port_list> <all | tagged>	To enable or disable the frame type. Two frame types are available, these are “All” or “Tagged”. The default setting is “All” to all ports. “Tagged” means that the port will only send and receive VLAN-tagged packets. When ports are set to “All”, they will send and receive both VLAN-tagged and untagged packets. <port_list>: 1~26 For example: Console(config-vlan)# frame-type 1-4,10-15,18,19 tagged
	pvid <port_list> <pvid>	The range of PVID is between 1 and 4094.

		VLAN ID will be assigned to untagged frames received on the interface. The default setting is 1. <port_list>: 1~26 <pvid>:1~4094 For example: Console(config-vlan)# pvid 1-4,10-15,18,19 1
	egress <port_list> <normal | untag>	To specify normal or untag to each port. <port_list>: 1~26 <normal | untag> The default setting to all ports is “Normal”. For example: Console(config-vlan)# egress 1-4,10-15,18,19 untag

3. SNMP NETWORK MANAGEMENT

The Simple Network Management Protocol (SNMP) is an application-layer protocol that facilitates the exchange of management information between network devices. It is part of the TCP/IP protocol suite. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth.

SNMP consists following key components,

Managed device is a network node that contains SNMP agent. Managed devices collect and store management information and make this information available to NMS using SNMP. Managed device can be switches/Hub, etc.

MIB (Management Information Base) define the complete manageable entries of the managed device. These MIB entries can be either read-only or read-write. For example, the System Version is read-only variables. The Port State Enable or Disable is a read-write variable and a network administrator can not only read but also set its value remotely.

SNMP Agent is a management module resides in the managed device that responds to the SNMP Manager request.

SNMP Manager/NMS executes applications that monitor and control managed devices. NMS provide the bulk of the processing and memory resources required for the complete network management. SNMP Manager often composed by desktop computer/work station and software program such like HP OpenView.
Totally 4 types of operations are used between SNMP Agent & Manager to change the MIB information. These 4 operations all use the UDP/IP protocol to exchange packets.

GET: This command is used by an SNMP Manager to monitor managed devices. The SNMP Manager examines different variables that are maintained by managed devices.

GET Next: This command provides traversal operation and is used by the SNMP Manager to sequentially gather information in variable tables, such as a routing table.

SET: This command is used by an SNMP Manager to control managed devices. The NMS changes the values of variables stored within managed devices.

Trap: Trap is used by the managed device to report asynchronously a specified event to the SNMP Manager. When certain types of events occur, a managed device will send a trap to alert the SNMP Manager.
The system built-in management module also supports SNMP management. User must install the MIB file before using the SNMP based network management system. The MIB file is on a disc or diskette that accompanies the system. The file name extension is .mib, which SNMP based compiler can read.
Please refer to the appropriate documentation for the instructions of installing the system private MIB.

4. WEB MANAGEMENT

You can manage the Managed Switch via a Web browser. However, you must first assign a unique IP address to the Managed Switch before doing so. Use the RS-232 DB-9 Console port or use a RJ45 LAN cable and any of the 10/100/1000Base-T RJ-45 ports of the Managed Switch (as the temporary RJ-45 Management Console port) to login to the Managed Switch and set up the IP address for the first time. (The default IP of the Managed Switch can be reached at **"http://192.168.0.1"**. You can change the Managed Switch's IP to the needed one later in its **Network Management** menu.)

Follow these steps to manage the Managed Switch through a Web browser:

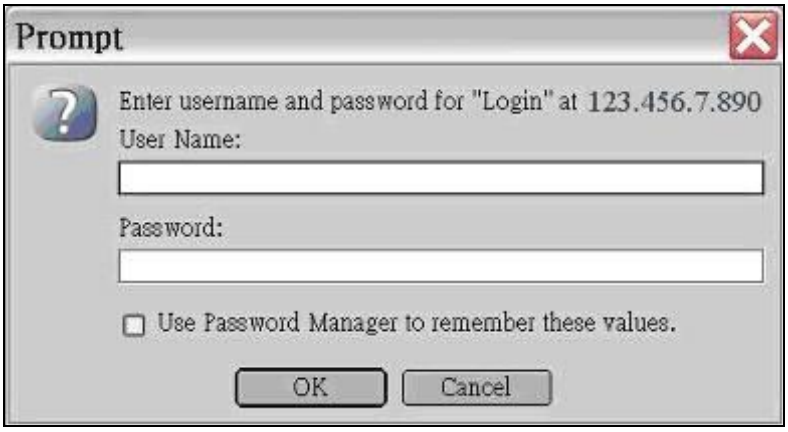
Use the RS-232 DB-9 Console port or any of the 10/100/1000Base-TX RJ-45 ports (as the temporary RJ-45 Management Console port) to set up the assigned IP parameters of the Managed Switch.

IP address
Subnet Mask
Default Converter Switch IP address, if required

Run a Web browser and specify the Managed Switch's IP address to reach it. (The Managed Switch's default IP can be reached at **"http://192.168.0.1"** before any changes.)

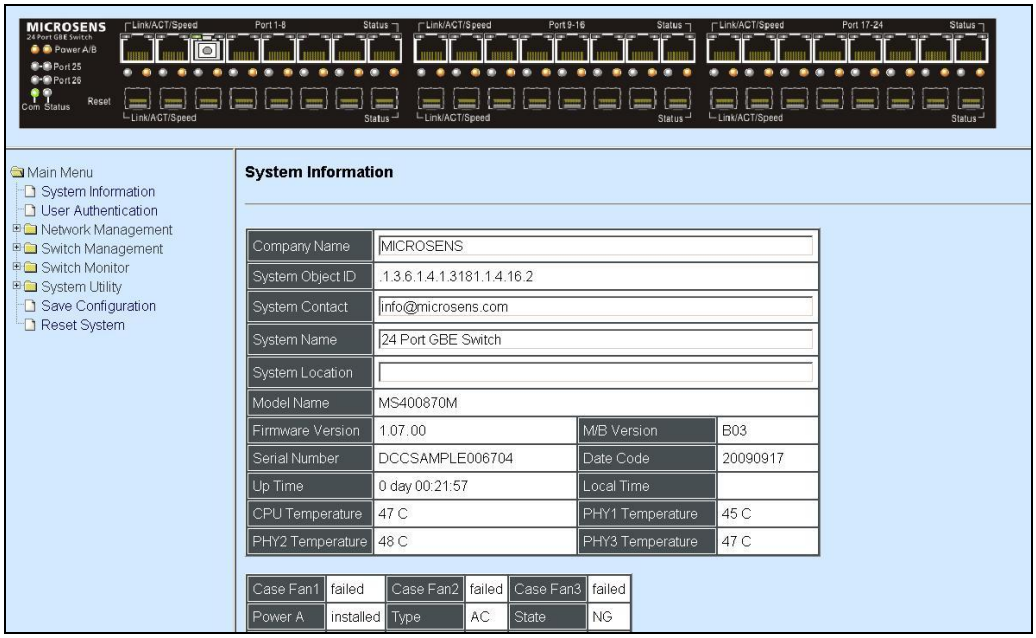
Login to the Managed Switch to reach the Main menu.

Once you gain the access, a Login window appears like this:



Enter the user name and password then select "OK" to login to the main screen page. The default username is **admin** and leave the password empty**.**

After a successful login, the Main Menu screen shows up. The rest of the menu functions in the Web Management are similar to those described at the Console Management and are also described below.



1. **System Information:** Name the Managed Switch, specify the location and check the current version of information.

2. **User Authentication:** View the registered user list. Add a new user or remove an existing user.

3. **Network Management:** Set up or view the IP address and related information of the Managed Switch required for network management applications.

4. **Switch Management:** Set up switch/port configuration, VLAN configuration and other functions.

5. **Switch Monitor:** View the operation status and traffic statistics of the ports.

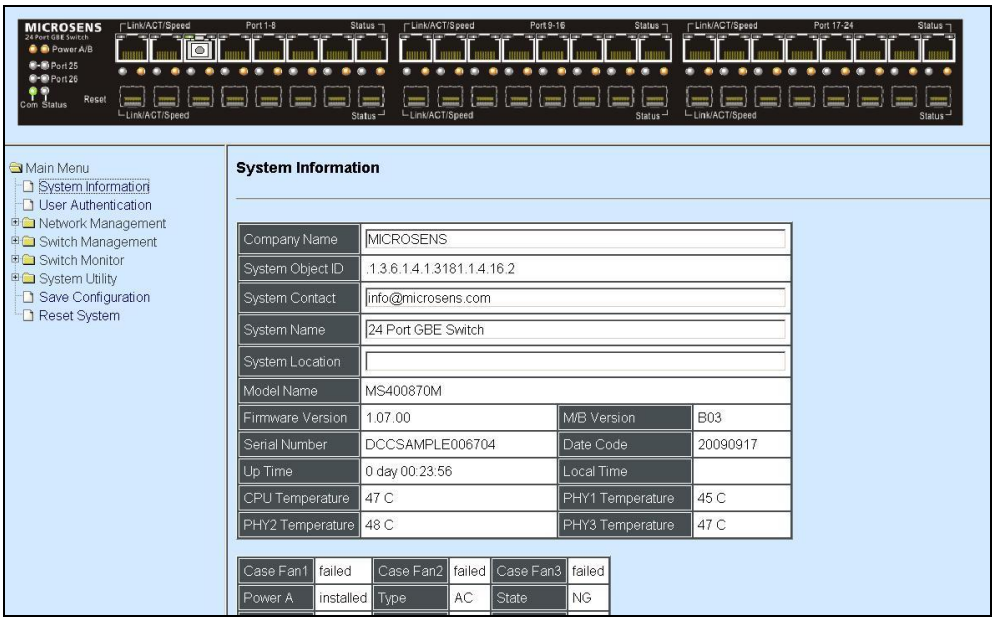
6. **System Utility:** Ping, Firmware Upgrade, Load Factory Settings, etc.

7. **Save Configuration:** Save all changes to the system.

8. **Reset System:** Reset the Managed Switch.

4.1 System Information

Select **System Information** in the Main Menu and then the following screen shows up.



Company Name: Enter a company name for this Managed Switch, up to 55 alphanumeric characters.

System Object ID: View-only field that shows the predefined System OID.

System Contact: Enter contact information for this Managed switch, up to 55 alphanumeric characters.

System Name: Enter a unique name for this Managed Switch, up to 55 alphanumeric characters. Use a descriptive name to identify the Managed Switch in relation to your network, for example, “Backbone 1”. This name is mainly used for reference only.

System Location: Enter a brief description of the Managed Switch location, up to 55 alphanumeric characters. Like the name, the location is for reference only, for example, “13th Floor”.

Model Name: View-only field that shows the product’s model name.

Firmware Version: View-only field that shows the product’s firmware version.

Case Fan: View-only field that shows the running status of case fan.

Power: View-only field that shows the running status of power module.

CPU Temperature: View-only field that shows the current CPU temperature.

PHY Temperature: View-only field that shows the current PHY temperature.

M/B Version: View-only field that shows the main board version.

Serial Number: View-only field that shows the serial number of this product.

Date Code: View-only field that shows the Managed Switch Firmware date code.

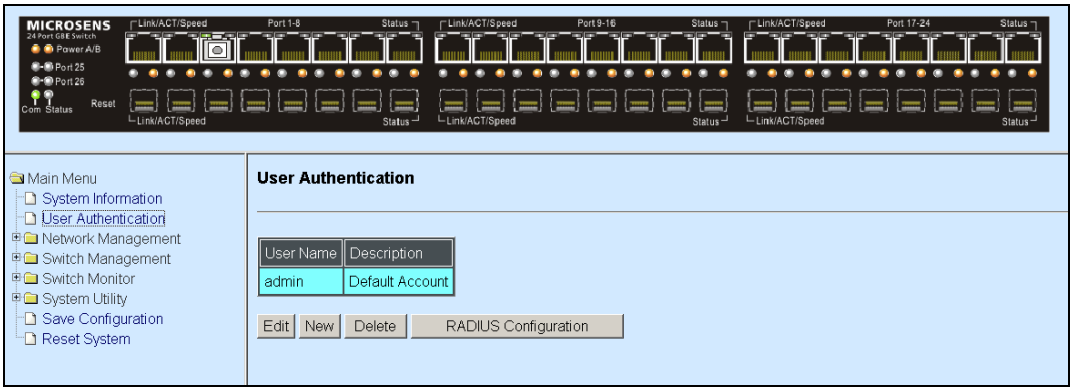
Up Time: View-only field that shows how long the system has been turned on**.**

Local Time: View-only field that shows the local time of the device.

4.2 User Authentication

To prevent any un-authorized operations, only registered users are allowed to operate the Managed Switch. Any users who want to operate the Managed Switch need to register into the user list first.

To view or change current registered users, select **User Authentication** from the main menu and then the following screen page shows up.



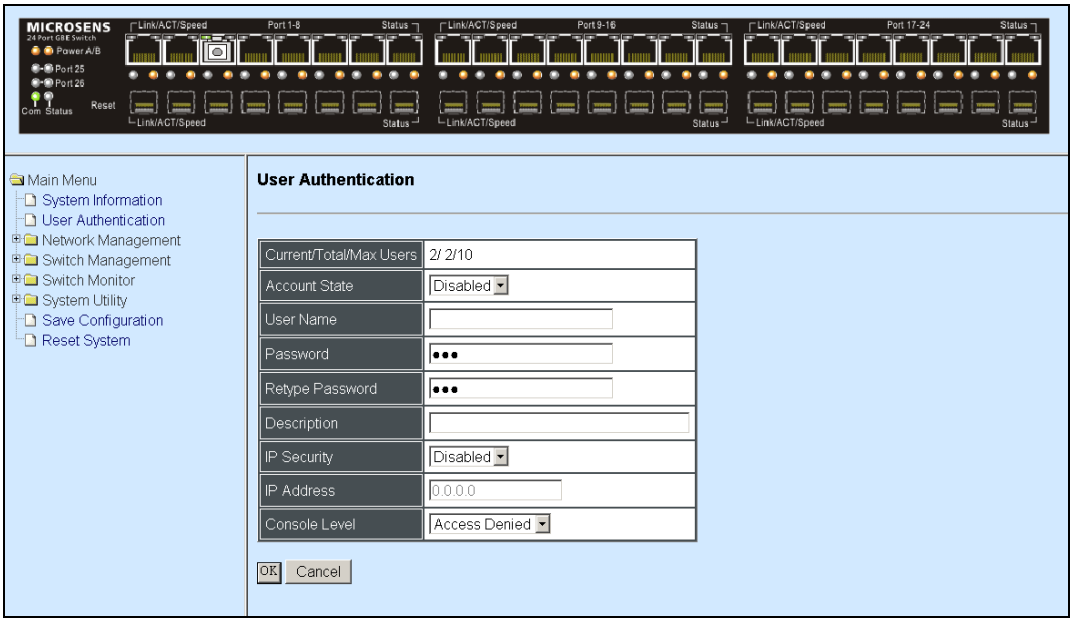
Up to 10 Users can be registered.

Click **New** to add a new user and then the following screen page appears.

Click **Edit** to view and edit a registered user setting.

Click **Delete** to remove a current registered user setting.

Click **RADIUS Configuration** for authentication setting via RADIUS.



Current/Total/Max Users: View-only field.

Current: This shows the number of current registered users.
Total: This shows the total number of users who have registered.
Max: This shows the maximum number available for registration. The maximum number is 10.

Account State: Enable or disable this user account.

User Name: Specify the authorized user login name, up to 20 alphanumeric characters.

Password: Enter the desired user password, up to 20 alphanumeric characters.

Retype Password: Enter the password again for double-checking.

Description: Enter a unique description for the user, up to 35 alphanumeric characters. This is mainly for reference only.

IP Security: Enable or disable the IP security function.

If enabled, the user can access the Managed Switch only through the management station which has exact IP address specified in IP address field below.
If disabled, the user can access the Managed Switch through any stations.

IP Address: Specify the IP address for IP Security function.

Console Level: Select the desired privilege for the Console operation from the pull-down menu. Four operation privileges are available in the Managed Switch:

Administrator: Full access right includes maintaining user account & system information, loading factory settings, etc.

Read & Write: Full access right but cannot modify user account & system information and load factory settings.

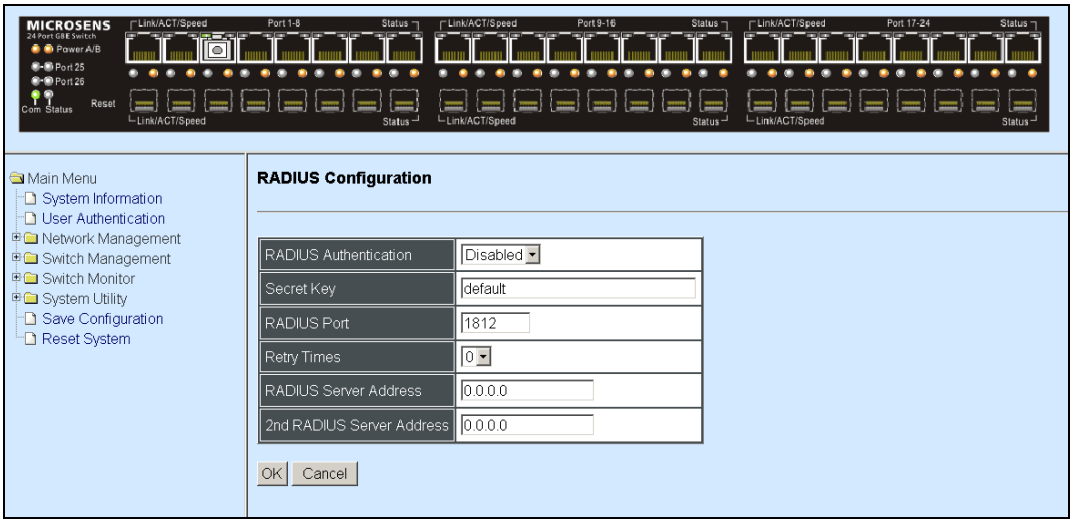
Read Only: Allow to view only.

Access Denied: Completely forbidden for access.

NOTE: *To prevent incautious operations, a user cannot delete, modify user name and enable or disable the account states.*

4.2.1 RADIUS Configuration

Click **RADIUS Configuration** in **User Authentication** and then the following screen page appears.



When **RADIUS Authentication** is enabled, User login will be according to those settings on the RADIUS server(s).

Note: *For advanced RADIUS Server set up, please refer to Appendix A or the "free RADIUS readme.txt" file on the disc provided with this product.*

Secret Key: The word to encrypt data of being sent to RADIUS server.

RADIUS Port: The RADIUS service port on RADIUS server.

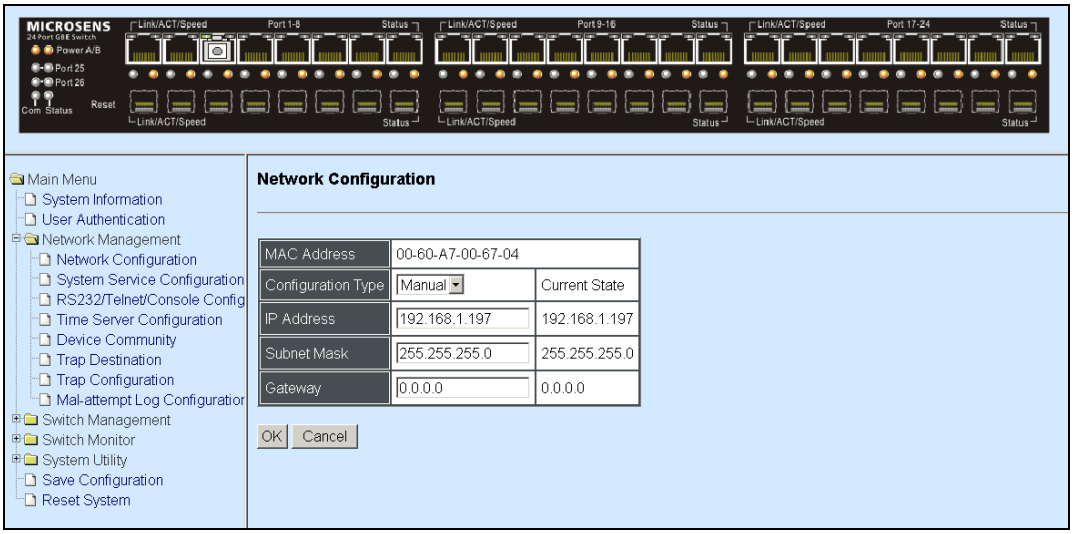
Retry Time: The number of trying to reconnect if the RADISU server is not reachable.

RADIUS Server Address: IP address of the first RADIUS server.

2nd RADIUS Server Address: IP address of the second RADIUS server.

4.3 Network Management

In order to enable network management of the Managed Switch, proper network configuration is required. To do this, click the folder **Network Management** from the WEB main menu and then the following screen page appears.



1. **Network Configuration:** Set up the required IP configuration of the Managed Switch.

2. **System Service Management:** Enable or disable the specified network services.

3. **RS232/Telnet/Console Configuration:** View the RS-232 serial port setting, specific Telnet and Console services.

4. **Time Server Configuration:** Set up the time server's configuration.

5. **Device Community:** View the registered SNMP community name list. Add a new community name or remove an existing community name.

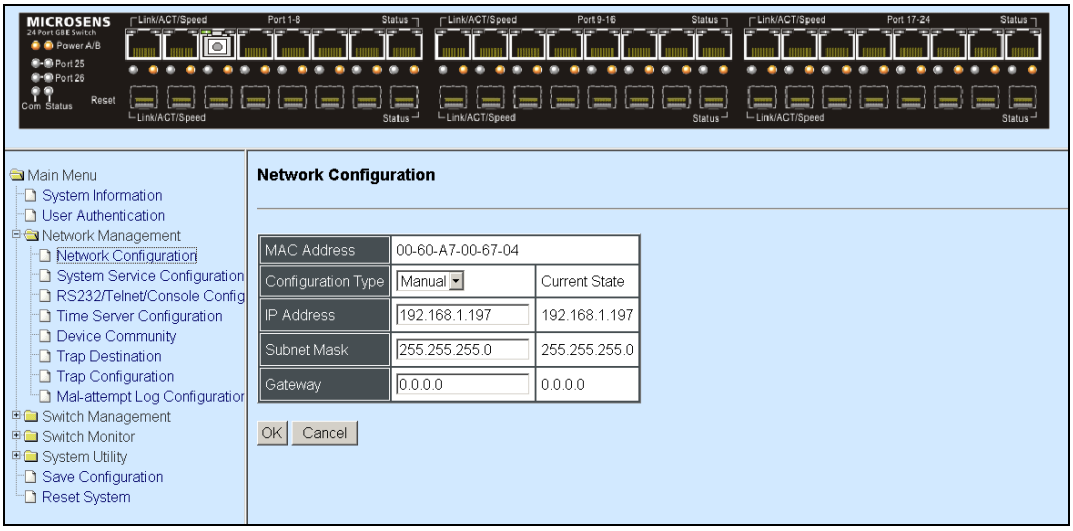
6. **Trap Destination:** View the registered SNMP trap destination list. Add a new trap destination or remove an existing trap destination.

7. **Trap Configuration:** View the Managed Switch trap configuration. Enable or disable a specific trap.

8. **Mal-attempt Log Configuration:** Set up the Mal-attempt Log server's configuration.

4.3.1 Network Configuration

Click the option **Network Configuration** from the **Network Management** menu and then the following screen page appears.



MAC Address: This view-only field shows the unique and permanent MAC address assigned to the Managed switch. You cannot change the Managed Switch's MAC address.

Configuration Type: There are two configuration types that users can select from the pull-down menu; these are "**DHCP**" and "**Manual**". When "**DHCP"** is selected and a DHCP server is also available on the network, the Managed Switch will automatically get the IP address from the DHCP server. If "**Manual"** is selected, users need to specify the IP address, Subnet Mask and Gateway.

IP Address: Enter the unique IP address of this Managed Switch. You can use the default IP address or specify a new one when the situation of address duplication occurs or the address does not match up with your network. (The default factory setting is 192.168.0.1.)

Subnet Mask: Specify the subnet mask. The default subnet mask values for the three Internet address classes are as follows:

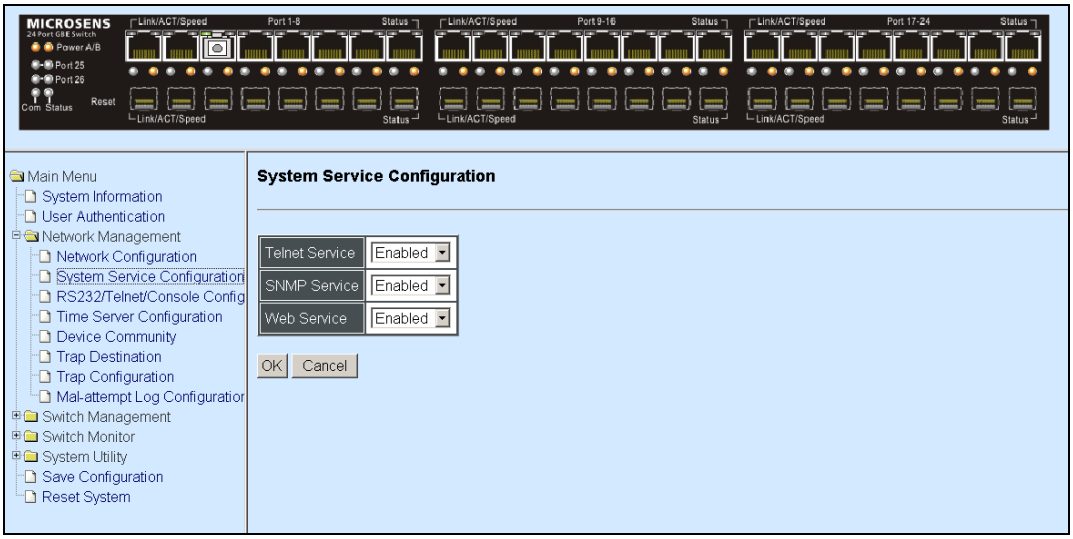
- Class A: 255.0.0.0
- Class B: 255.255.0.0
- Class C: 255.255.255.0

Gateway: Specify the IP address of a gateway or a router, which is responsible for the delivery of the IP packets sent by the Managed Switch. This address is required when the Managed Switch and the network management station are on different networks or subnets. The default value of this parameter is 0.0.0.0, which means no gateway exists and the network management station and Managed Switch are on the same network.

Current State: This View-only field shows currently assigned IP address (by DHCP or manual), Subnet Mask and Gateway of the Managed Switch.

4.3.2 System Service Configuration

Click the option **System Service Configuration** from the **Network Management** menu and then the following screen page appears.



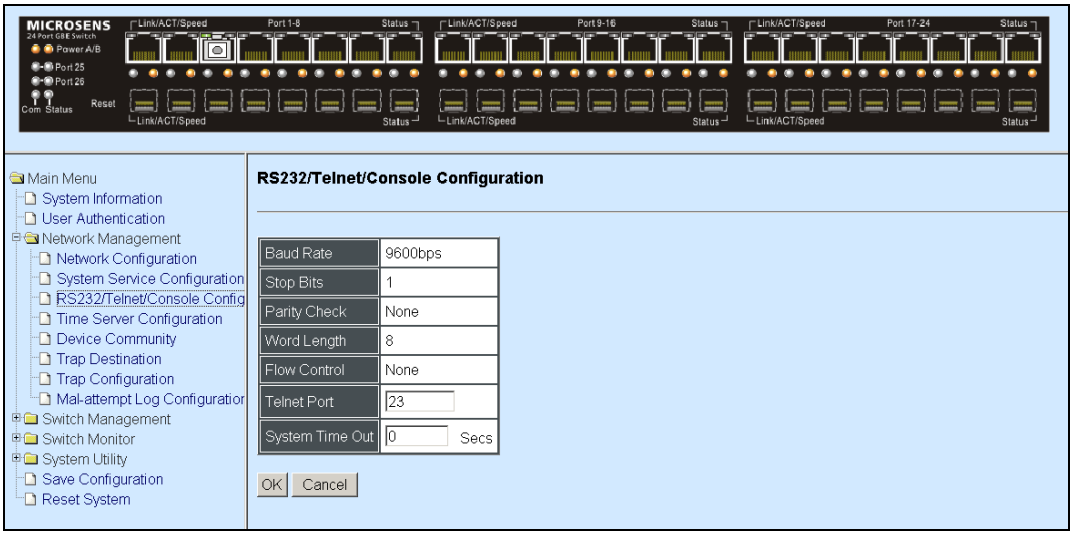
Telnet Service: To enable or disable the Telnet Management service.

SNMP Service: To enable or Disable the SNMP Management service.

Web Service: To enable or Disable the Web Management service.

4.3.3 RS232/Telnet/Console Configuration

Click the option **RS232/Telnet/Console Configuration** from the **Network Management** menu and then the following screen page appears.



Baud Rate: 9600 bps, RS-232 setting, view-only field.

Stop Bits: 1, RS-232 setting, view-only field.

Parity Check: None, RS-232 setting, view-only field.

Word Length: 8, RS-232 setting, view-only field.

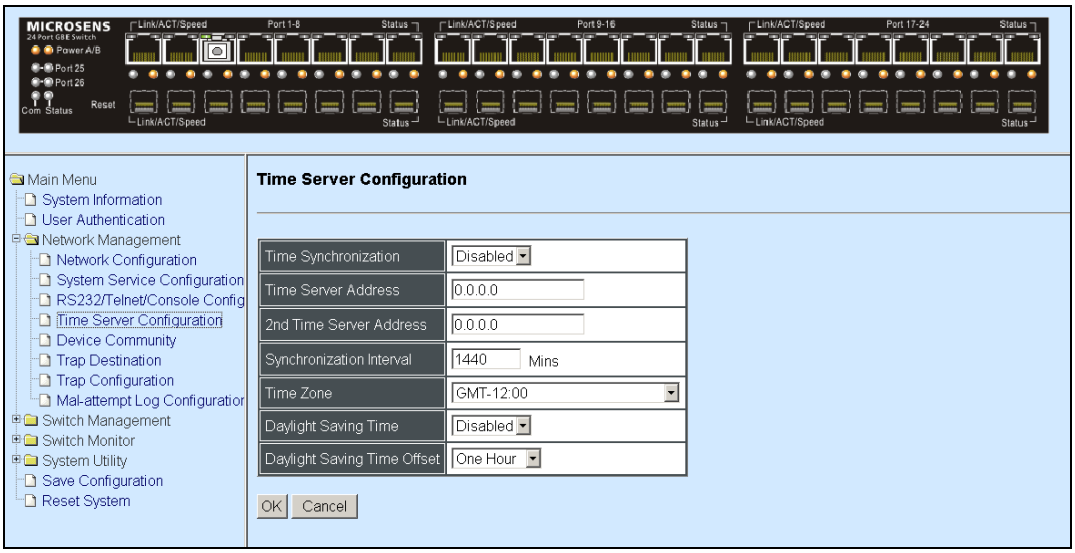
Flow Control: None, RS-232 setting, view-only field.

Telnet Port: Specify the desired TCP port number for the Telnet Console. The default TCP port number of the Telnet is 23.

System Time Out: Specify the desired time that the Managed Switch will wait before disconnecting an inactive Console/telnet. Specifying "0" means an inactive connection will never be disconnected.

4.3.4 Time Server Configuration

Click the option **Time Server Configuration** from the **Network Management** menu and then the following screen page appears.



Time Synchronization: To enable or disable time synchronization.

Time Server Address: NTP time server address.

2nd Time Server Address: When the default time server is down, the Managed Switch will automatically connect to the 2nd time server.

Synchronization Interval: The time interval to synchronize from NTP time server.

Time Zone: Select the appropriate time zone from the pull-down menu.

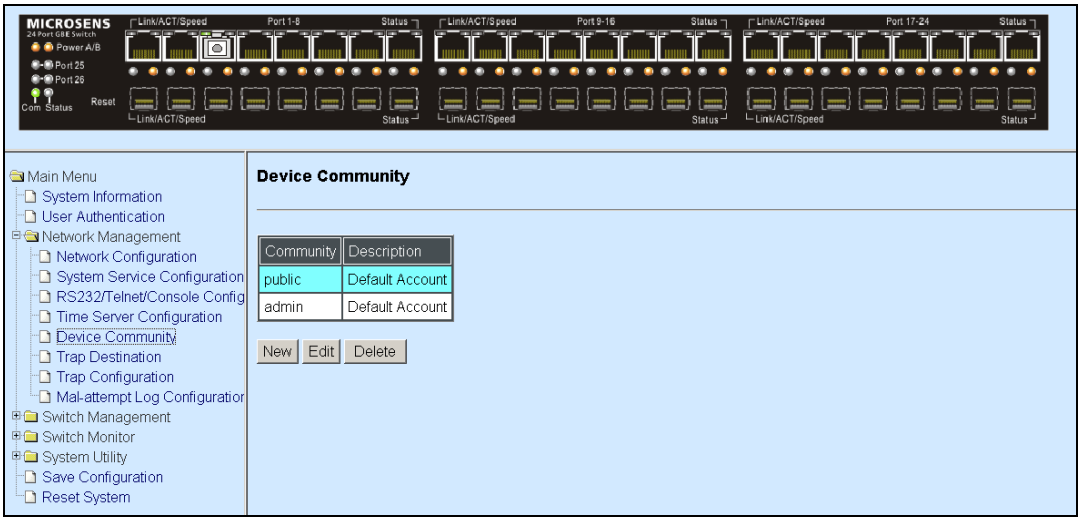
Daylight Saving Time: To enable or disable the daylight saving time function. It is a way of getting more daytime hour(s) by setting the time to be hour(s) ahead in the morning.

Daylight Saving Time Offset: Click the pull-down menu to select the time offset of daylight saving time.

NOTE: *We use SNTP to get the time from those NTP servers. It is recommended that the time server is in the same LAN with the Managed Switch or at least not too far away. In this way, the time will be more accurate.*

4.3.5 Device Community

Click the option **Device Community** from the **Network Management** menu and then the following screen page appears.

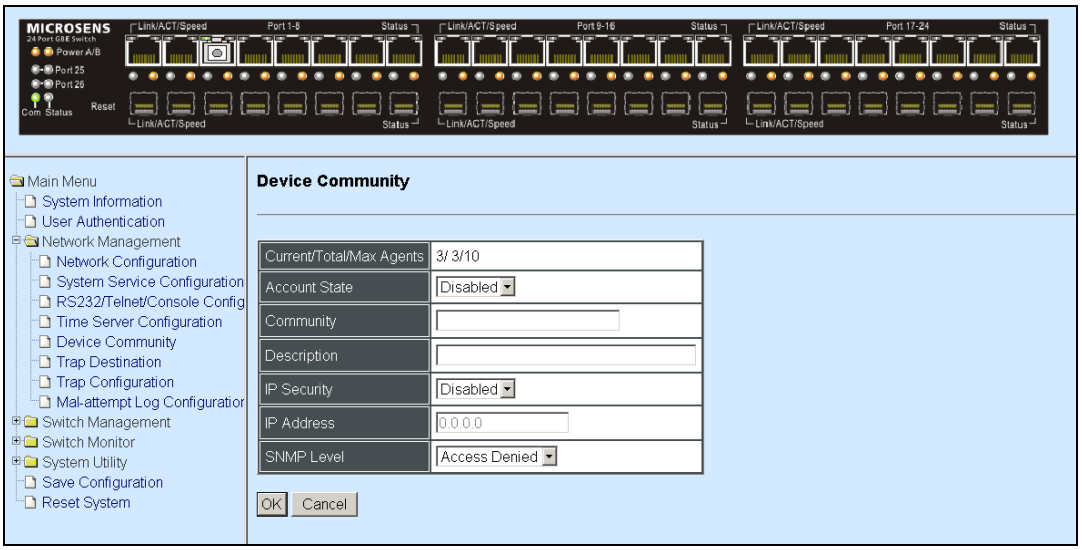


Up to 10 Device Communities can be set up.

Click **New** to add a new community and then the following screen page appears.

Click **Edit** to view the current community settings.

Click **Delete** to remove a registered community.



Current/Total/Max Agents: View-only field.

Current: This shows the number of current registered communities.
Total: This shows the number of total registered community users.
Max Agents: This shows the number of maximum number available for registration. The default maximum number is 10.

Account State: Click the pull-down menu to enable or disable this Community Account.

Community: Specify the authorized SNMP community name, up to 20 alphanumeric characters.

Description: Enter a unique description for this community name, up to 35 alphanumeric characters. This is mainly for reference only.

IP Security: Click the pull-down menu to enable or disable the IP security function.

If enabled, Community may access the Managed Switch only through the management station, which has the exact IP address specified in IP address field below.
If disabled, Community can access the Managed Switch through any management stations.

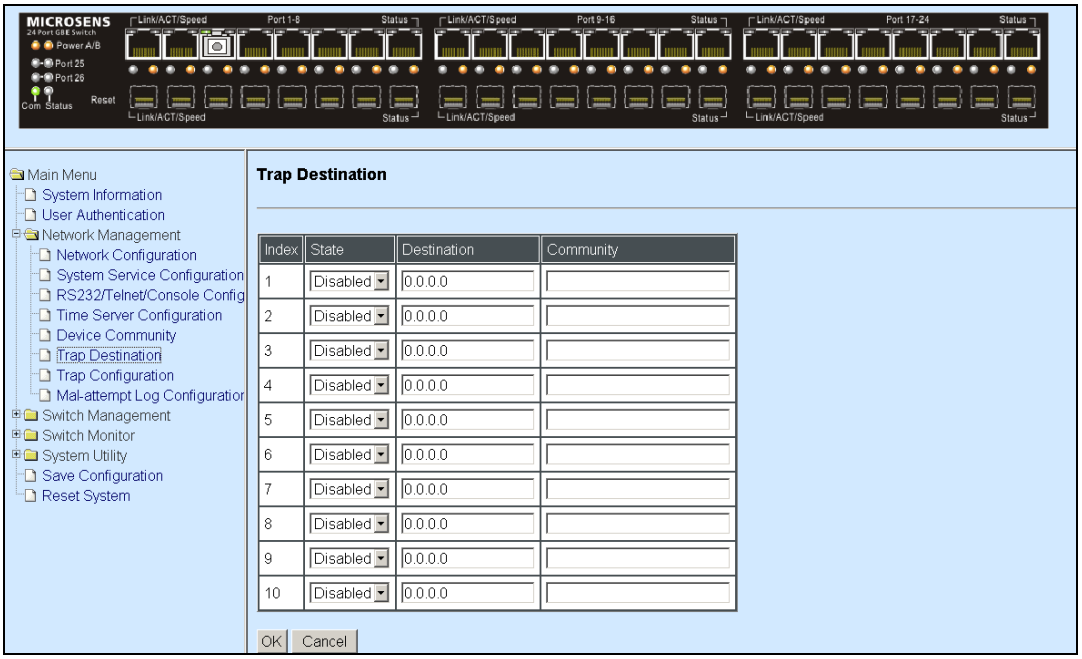
IP Address: Specify the IP address used for IP Security function.

SNMP Level: Click the pull-down menu to select the desired privilege for the SNMP operation

NOTE: *When the community browses the Managed Switch without proper access right, the Managed Switch will respond nothing. For example, if a community only has Read & Write privilege, then it cannot browse the Managed Switch's user table.*

4.3.6 Trap Destination

Click the option **Trap Destination** from the **Network Management** menu and then the following screen page appears.



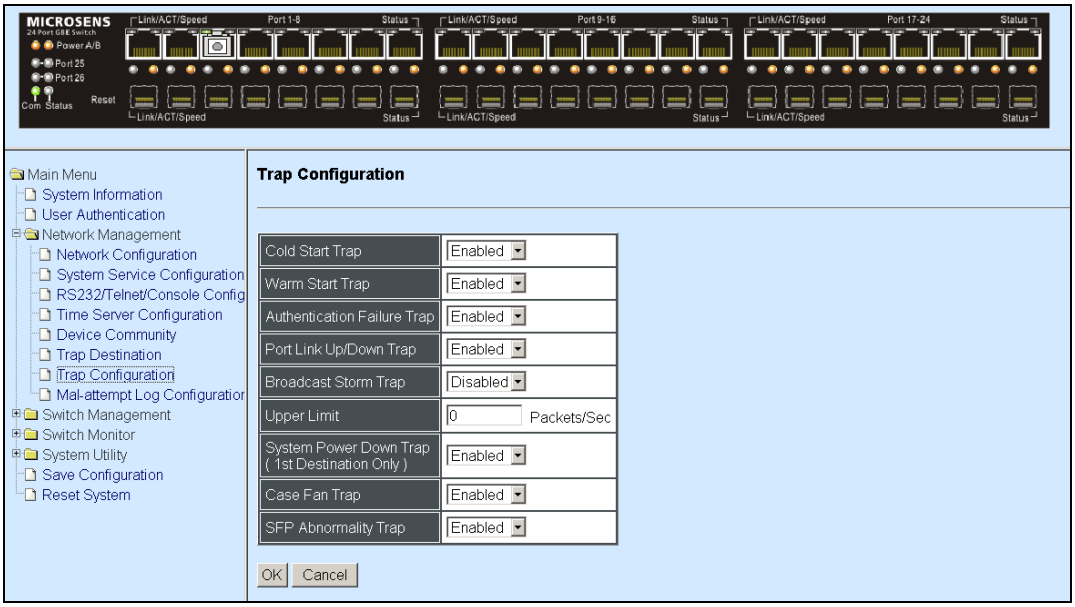
State: Enable or disable the function of sending trap to the specified destination.

Destination: Enter the specific IP address of the network management system that will receive the trap.

Community: Enter the community name of the network management system.

4.3.7 Trap Configuration

Click the option **Trap Configuration** from the **Network Management** menu and then the following screen page appears.



Cold Start Trap: Enable or disable the Managed Switch to send a trap when the Managed Switch cold starts.

Warm Start Trap: Enable or disable the Managed Switch to send a trap when the Managed Switch warm starts.

Authentication Failure Trap: Enable or disable the Managed Switch to send authentication failure trap after any unauthorized users attempt to login.

Port Link Up/Down Trap: Enable or disable the Managed Switch to send port link up/link down trap.

Broadcast Storm Trap: Enable or disable broadcast storm trap sending from the Managed Switch when broadcast packets reach the upper limit.

Upper Limit: Maximum broadcast packets number per second. The broadcast storm trap will be sent when the Managed Switch exceeds the specified limit.

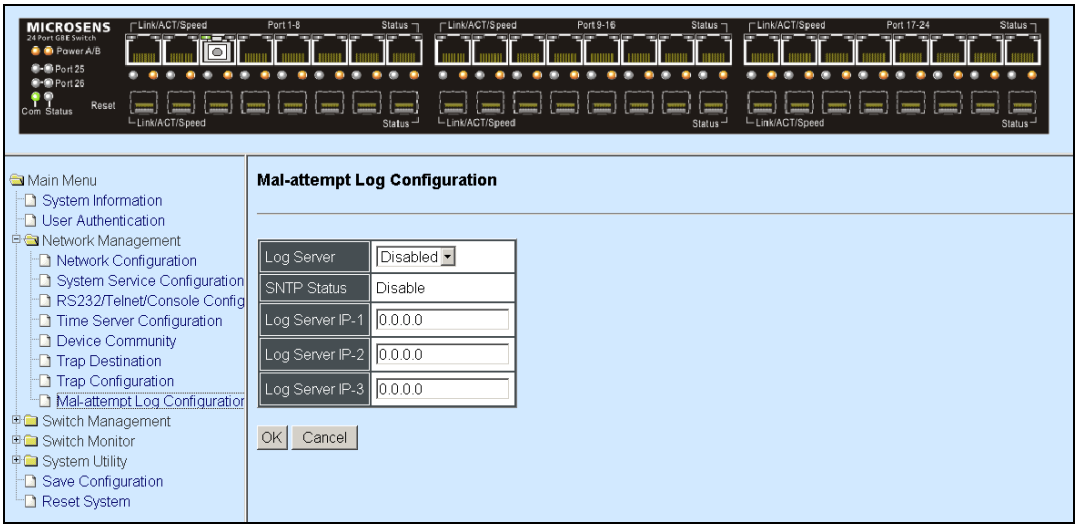
System Power Down Trap: Send a trap notice while the Managed Switch is power down.

Case Fan Trap: Enable or disable the Managed Switch to send a trap when fan is not working or failed.

SFP Abnormality Tray: Enable or disable the Managed Switch to send SFP abnormality trap.

4.3.8 Mal-attempt Log Configuration

Click the option **Trap Configuration** from the **Network Management** menu and then the following screen page appears.



When DHCP snooping filter unauthorizes DHCP packets on the network, the Mal-attempt log will allow the Managed Switch to send event notification message to Log server.

Log Server: Click the Pull-down menu to enable or disable Mal-attempt log.

SNTP Status: View-only field that shows the SNMP status.

Log Server IP-1: Specify the default Log server IP address.

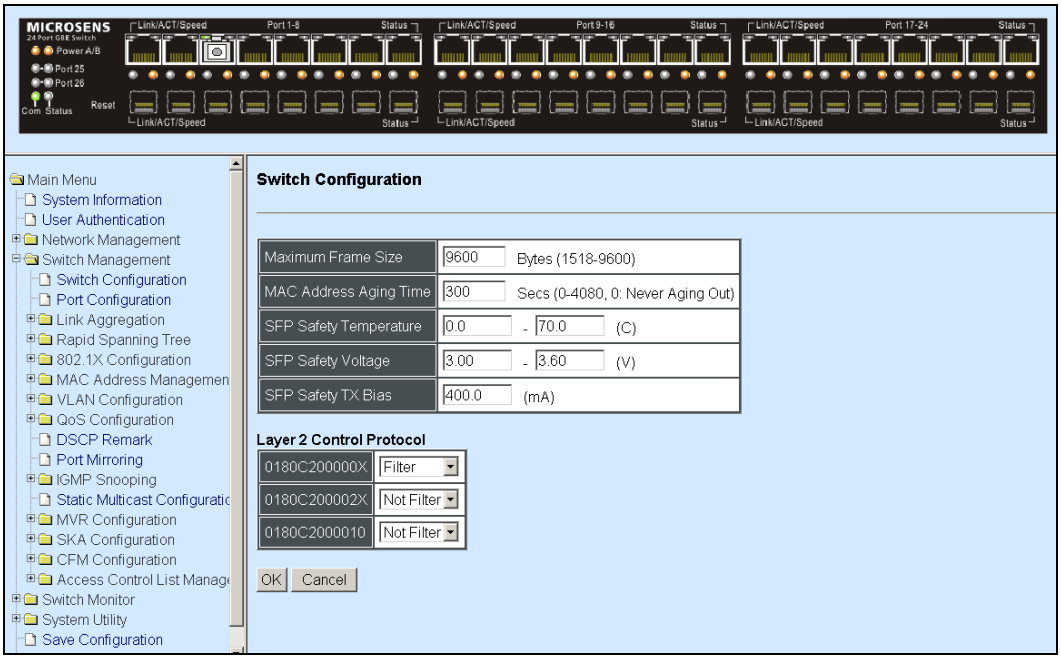
Log Server IP-2: Specify the second Log server IP address.

Log Server IP-3: Specify the third Log server IP address.

When the default Log Server is down, the Managed Switch will automatically contact the second or third Log server.

4.4 Switch Management

In order to manage the Managed switch and set up required switching functions, click the folder icon **Switch Management** from the Console main menu and then several options and folders will be displayed for your selection.



1. **Switch Configuration:** Set up frame size, address learning, etc.

2. **Port Configuration:** Enable or disable port speed, flow control, etc.

3. **Link Aggregation:** Set up port trunk and LACP port configuration.

4. **Rapid Spanning Tree:** Set up RSTP switch settings, aggregated port settings, physical port settings, etc.

5. **802.1X Configuration:** Set up the 802.1X system, port Admin state, port reauthenticate.

6. **MAC Address Management:** Set up MAC address, enable or disable MAC security, etc.

7. **VLAN Configuration:** Set up VLAN mode and VLAN configuration.

8. **QoS Configuration:** Set up the priority queuing, rate limit and storm control.

9. **Port Mirroring:** Set up target port to mirror source port so as to enable traffic monitoring.

10. **IGMP Snooping:** Enable or disable IGMP and set up IGMP VLAN ID configuration.

11. **Static Multicast Configuration:** To create, edit or delete Static Multicast table.

12. **MVR Configuration:** Enable or disable MVR and create MVR VLAN setting.

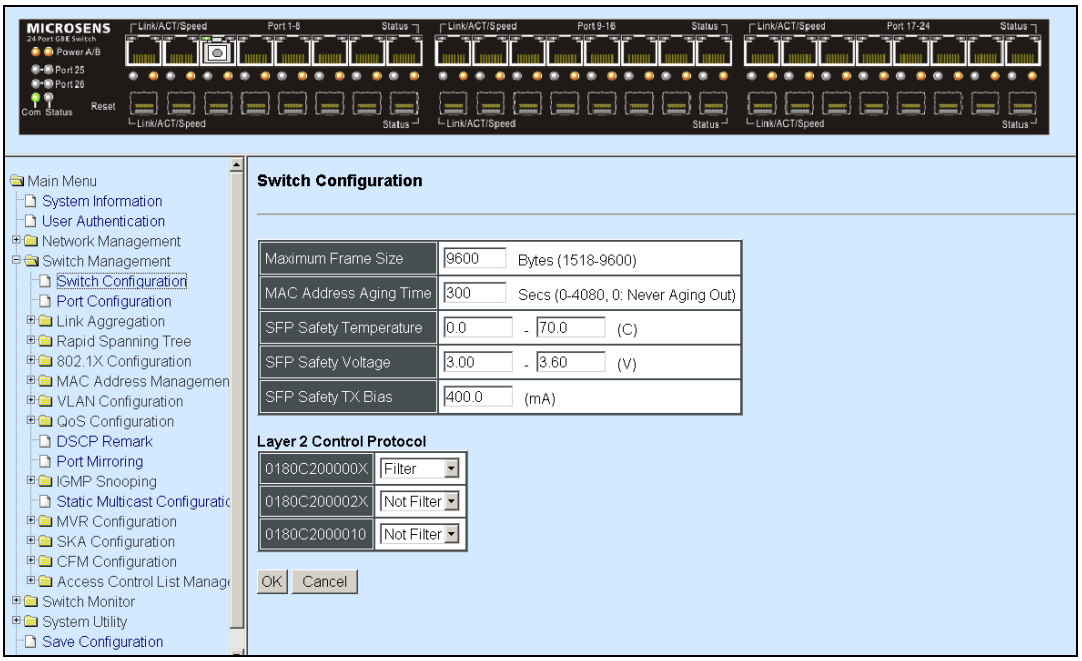
13. **SKA Configuration:** Set up DHCP option 82 agent relay, port setting, filtering and static IP table configuration.

14. **CFM Configuration:** Set up CFM maintenance domain, maintenance association, maintenance end point list, maintenance end port settings, loopback testing and linktrace testing.

15. **Access Control List Management:** Set up access control list ports and rate limiter.

4.4.1 Switch Configuration

Click the option **Switch Configuration** from the **Switch Management** menu and then the following screen page appears.



Maximum Frame Size: Specify the maximum frame size between 1518 and 9600 bytes. The default maximum frame size is 9600bytes.

MAC Address Aging Time: Specify MAC Address aging time between 0 and 1048575 seconds.

SFP Safety Temperature: Enter the specific temperature for the Managed Switch to detect the SFP DMI safety range. (Default 0~70C)

SFP Safety Voltage: Enter the specific Voltage for the Managed Switch to detect the SFP DMI safety range. (Default 3~3.6V)

SFP Safety TX Bias: Enter the specific Bias for the Managed Switch to detect the SFP DMI safety range. (Default 400mA)

Layer 2 Control Protocol:

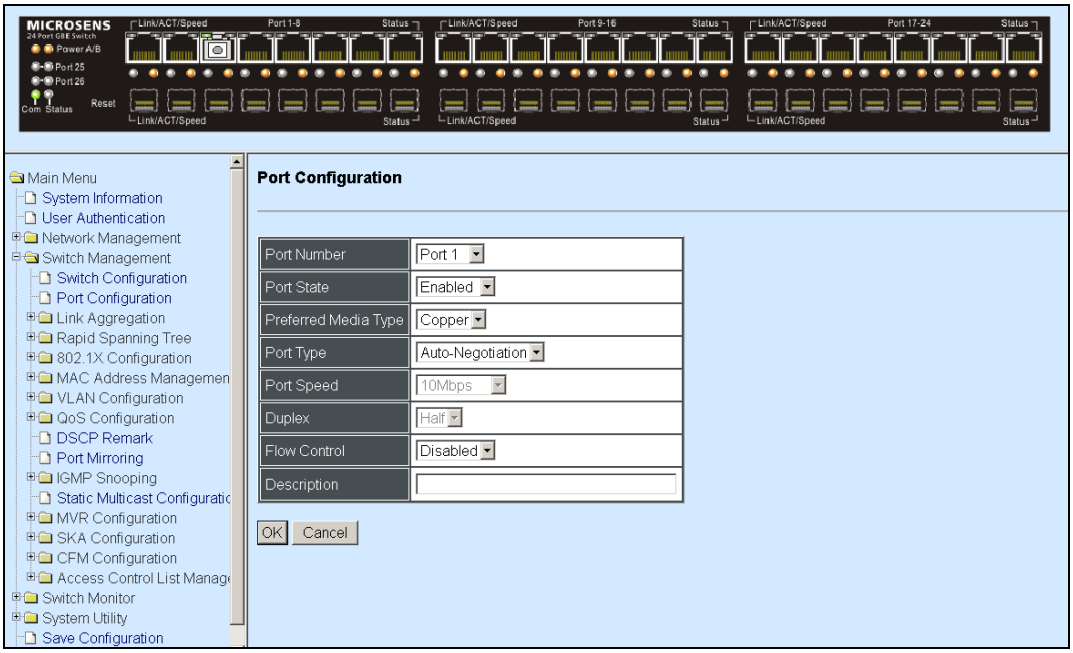
0180C200000X: Select either “Not Filter” or “Filter”. When “Filter” is selected, packets from the address 0180C200000X will be filtered or dropped.

0180C200002X: Select either “Not Filter” or “Filter”. When “Filter” is selected, packets from the address 0180C200002X will be filtered or dropped.

0180C2000010: Select either “Not Filter” or “Filter”. When “Filter” is selected, packets from the address 0180C2000010 will be filtered or dropped.

4.4.2 Port Configuration

Click the option **Port Configuration** from the **Switch Management** menu and then the following screen page appears.



Port Number: Click the pull-down menu to select the port number for configuration.

Port State: Enable or disable the current port state.

Preferred Media Type: Select copper or fiber as the preferred media type.

Port Type: Select Auto-Negotiation or Manual mode as the port type.

Port Speed: When you select Manual port type, you can further specify the transmission speed (10Mbps/100Mbps/1000Mbps) of the port(s).

Duplex: When you select Manual port type, you can further specify the current operation Duplex mode (full or half duplex) of the port(s).

Flow Control: Enable or disable the flow control.

Description: Enter the unique description for this port.

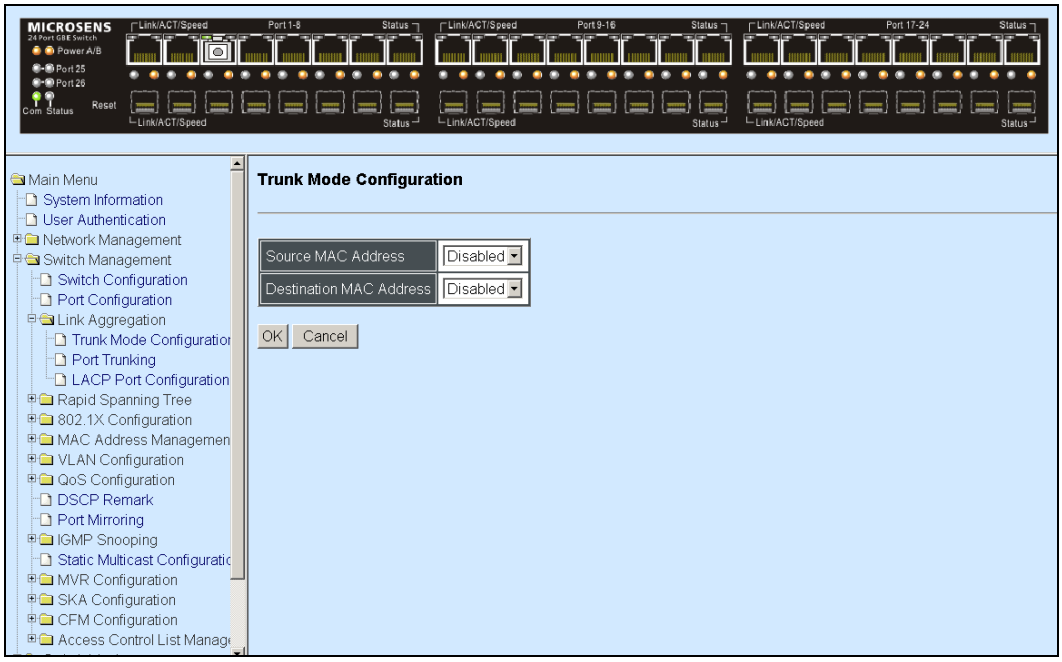
4.4.3 Link Aggregation

Link aggregation is an inexpensive way to set up a high-speed backbone network that transfers much more data than any one single port or device can deliver without replacing everything and buying new hardware.

For most backbone installations, it is common to install more cabling or fiber optic pairs than initially necessary, even if there is no immediate need for the additional cabling. This action is taken because labor costs are higher than the cost of the cable and running extra cable reduces future labor costs if networking needs changes. Link aggregation can allow the use of these extra cables to increase backbone speeds with little or no extra cost if ports are available.

This Managed switch supports 2 link aggregation modes: static **Port Trunk** and dynamic **Link Aggregation Control Protocol (LACP)** using the IEEE 802.3ad standard. These allow several devices to communicate simultaneously at their full single-port speed while not allowing any one single device to occupy all available backbone capacities.

Click **Link Aggregation** folder from the **Switch Management** menu and then three options within this folder will be displayed.



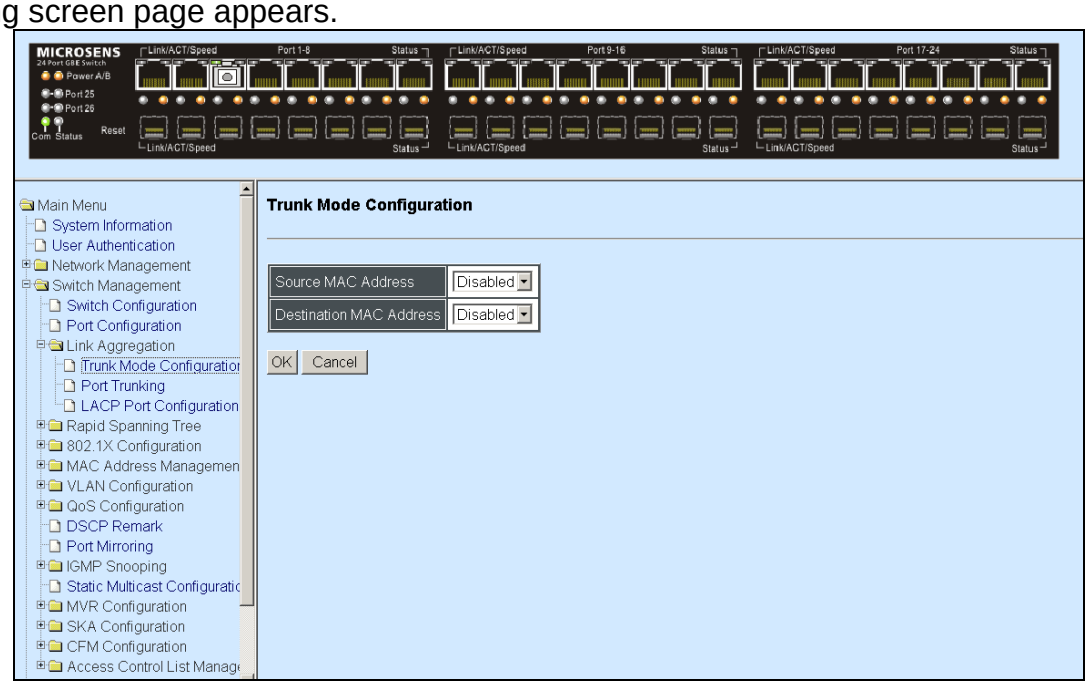
Trunk Mode Configuration: Enable or disable Source and Destination MAC address.

Port Trunking: Create, edit or delete port trunking group(s).

LACP Port Configuration: Set up the configuration of LACP on all or some ports.

4.4.3.1 Trunk Mode Configuration

Click the option **Trunk Mode Configuration** from the **Link Aggregation** menu, the following screen page appears.



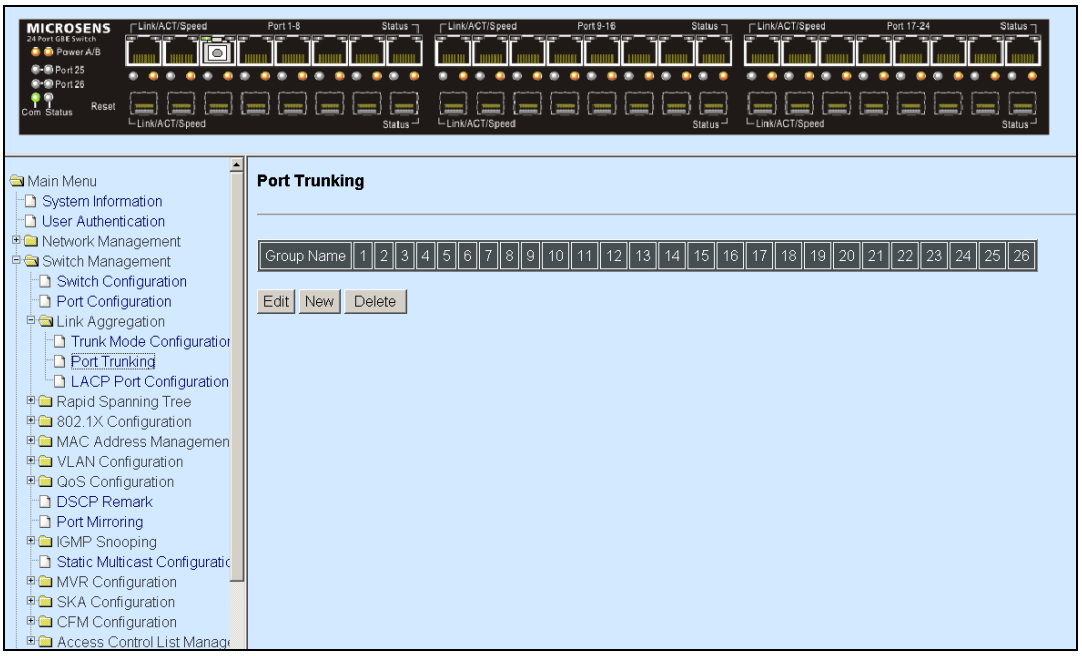
There are two fields for you to set up packets according to operations.

Source MAC Address: Enable or disable packets according to source MAC address.

Destination MAC Address: Enable or disable packets according to destination MAC address.

4.4.3.2 Port Trunking

Click the option **Port Trunk Configuration** from the **Link Aggregation** menu and then the following screen page appears.

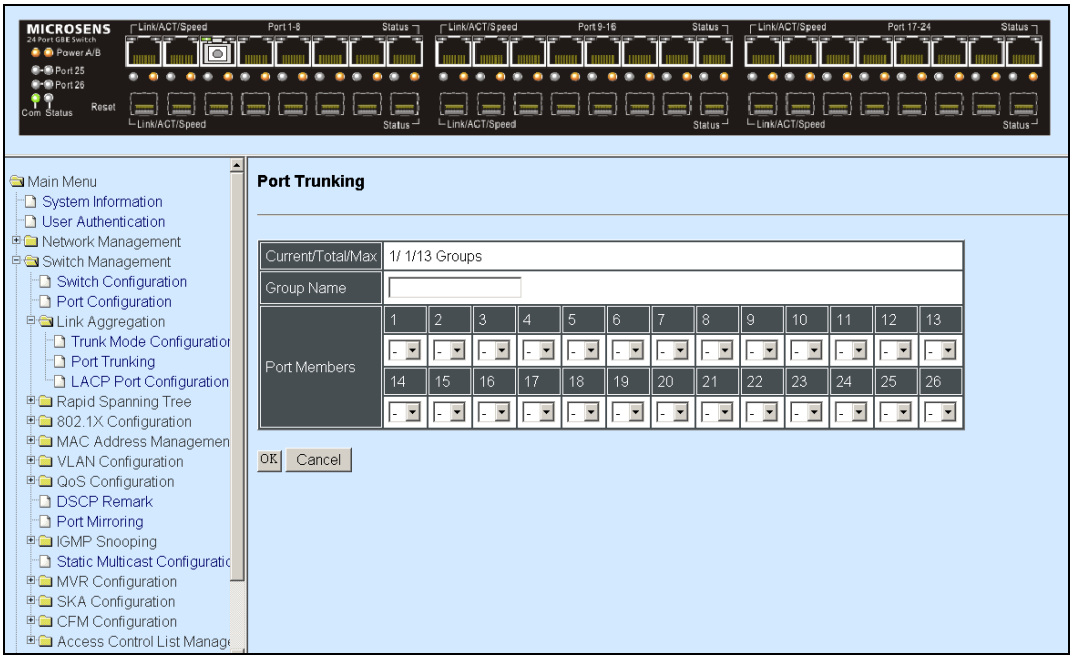


The Managed Switch allows users to create 13 trunking groups. Each group consists of 2 to 16 links (ports).

Click **New** to add a new trunking group and then the following screen page appears.

Click **Delete** to remove a current registered trunking group setting.

Click **Edit** to view and edit a registered trunking group's settings.



Group Name: Specify the trunking group name of up to 15 alphanumeric characters.

Port Members: Select the trunk group to which a port belongs.
- Must have 2 to 16 ports in each trunking group.
- Each port can only be grouped in one group.
- If the port is already set On in LACP Port Configuration, it can't be grouped anymore.

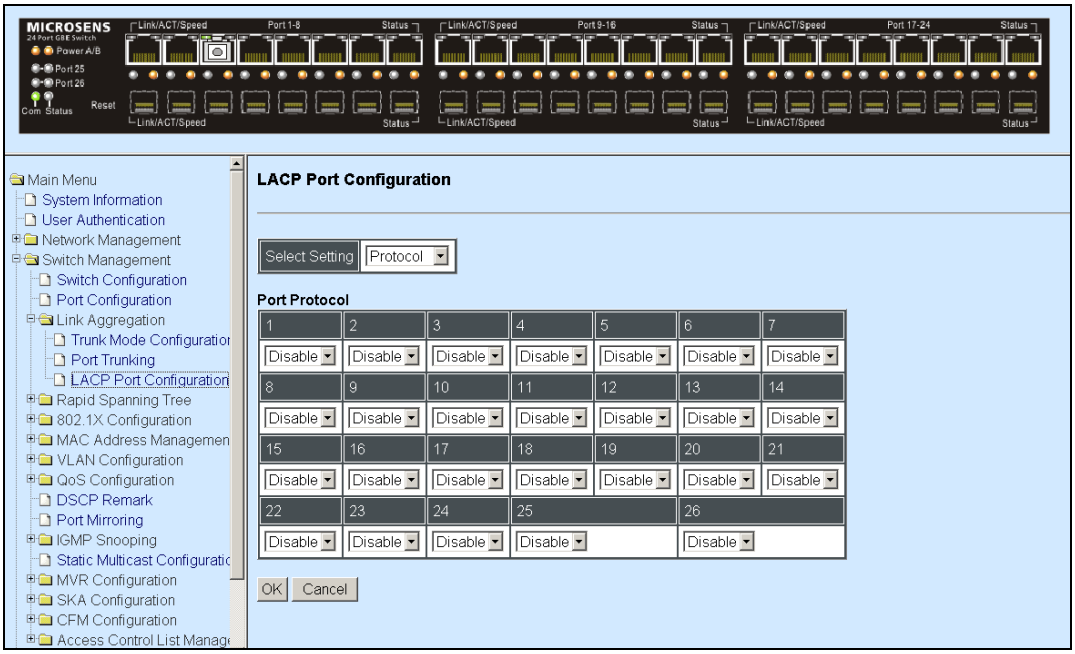
Click **OK** and return back to **Link Aggregation** menu.

Note: *All of the trunking ports in the group must be members of the same VLAN and their Spanning Tree Protocol (STP) status and QoS default priority configurations must be identical. Port locking, port mirroring and 802.1X can not be enabled on the trunk group. Furthermore, the LACP aggregated links must all be of the same speed and should be configured as full duplex.*

4.4.3.3 LACP Port Configuration

The Managed Switch supports dynamic Link Aggregation Control Protocol (LACP) which is specified in IEEE 802.3ad. Static trunks have to be manually configured at both ends of the link. In other words, LACP configured ports can automatically negotiate a trunked link with LACP configured ports on another devices. You can configure any number of ports on the Managed Switch as LACP, as long as they are not already configured as part of a static trunk. If ports on other devices are also configured as LACP, the Managed Switch and the other devices will negotiate a trunk link between them. If an LACP trunk consists of more than four ports, all other ports will be placed in a standby mode. Should one link in the trunk fail, one of the standby ports will automatically be activated to replace it.

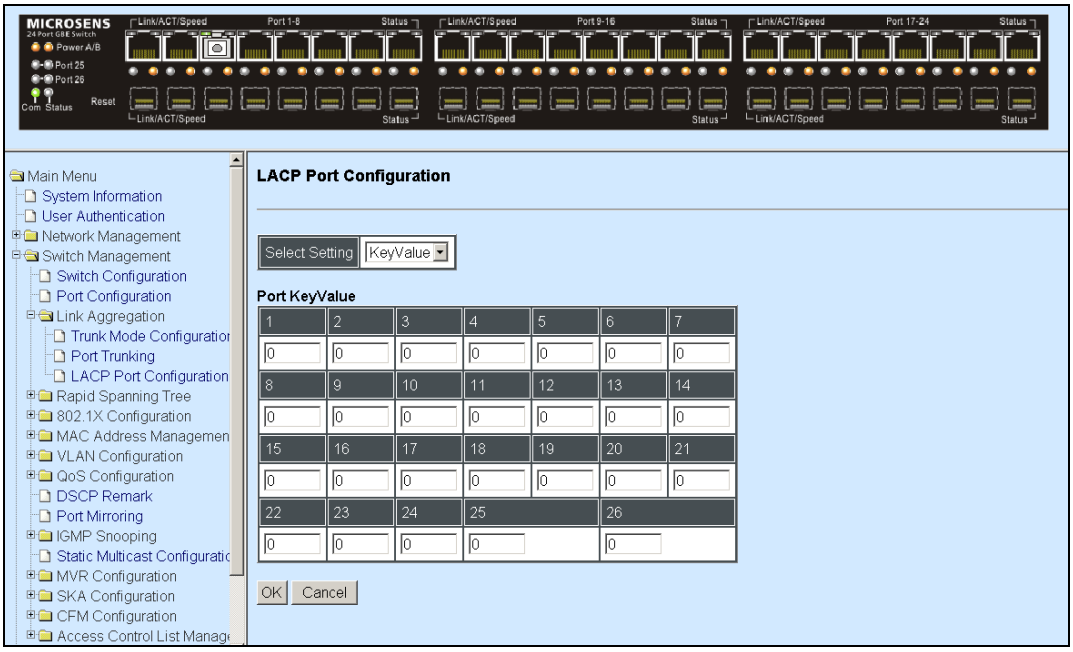
Configure Port Protocol:
Click the option **LACP Port Configuration** from the **Link Aggregation** menu and then select "Protocol" from the pull-down menu of Select Setting. The screen page is shown below.



This allows LACP to be enabled or disabled. When it is On, LACP is enabled.

Configure Key Value:

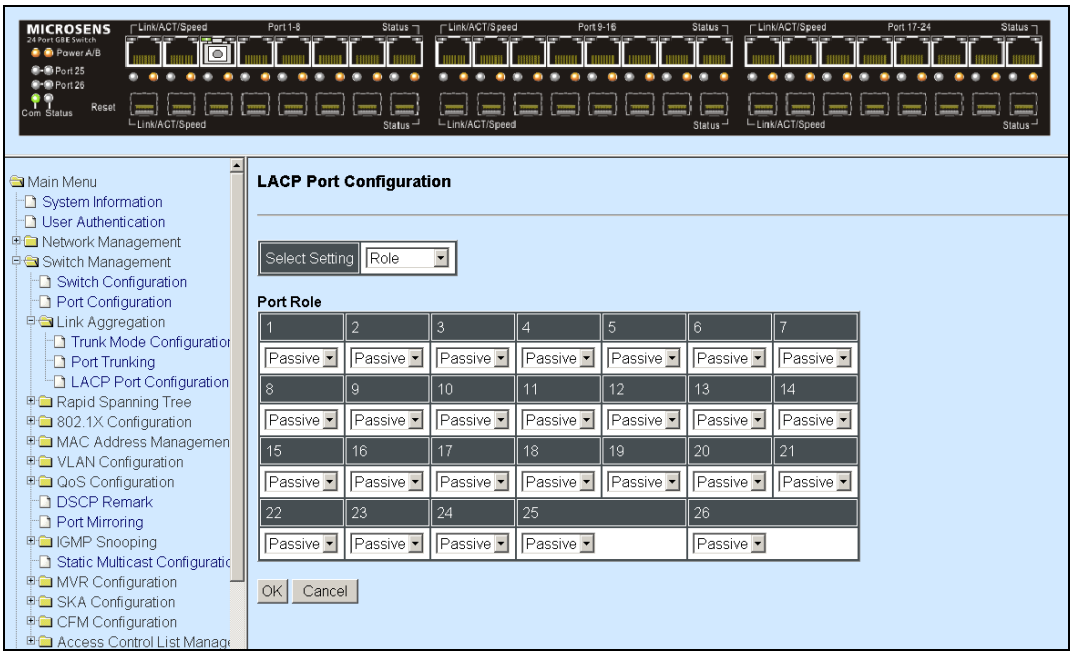
Select “Key Value” from the pull-down menu of Select Setting.



Ports in an aggregated link group must have the same LACP port Key. In order to allow a port to join an aggregated group, the port Key must be set to the same value. The range of key value is between 0 and 255. When key value is set to 0, the port Key is automatically set by the Managed Switch.

Configure Port Role:

Select “Role” from the pull-down menu of Select Setting.



Active – Active LACP ports are capable of processing and sending LACP control frames. This allows LACP compliant devices to negotiate the aggregated link so that the group may be changed dynamically as required. In order to utilize the ability to change an aggregated port group, that is, to add or remove ports from the group, at least one of the participating devices must designate LACP ports as active. Both devices must support LACP.

Passive –LACP ports that are designated as passive cannot initially send LACP control frames. In order to allow the linked port group to negotiate adjustments and make changes dynamically, one end of the connection must have “active” LACP ports.

4.4.4 Rapid Spanning Tree

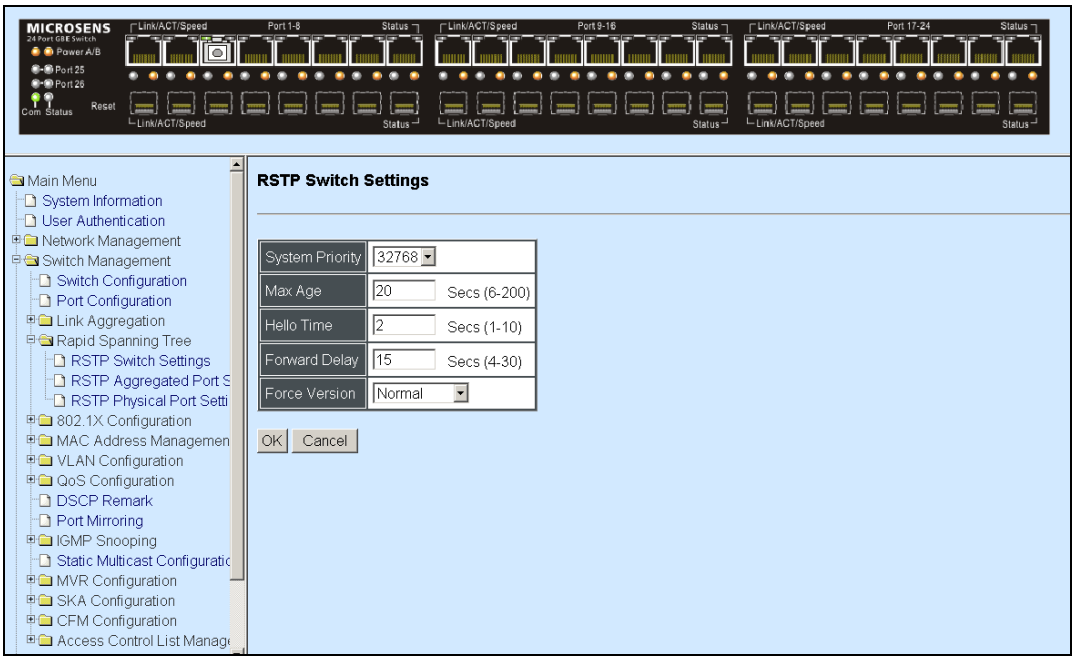
The Spanning Tree Protocol (STP), defined in the IEEE Standard 802.1D, creates a spanning tree within a mesh network of connected layer-2 bridges (typically Ethernet switches) and disables the links which are not part of that tree, leaving a single active path between any two network nodes.

Multiple active paths between network nodes cause a bridge loop. Bridge loops create several problems. First, the MAC address table used by the switch or bridge can fail, since the same MAC addresses (and hence the same network hosts) are seen on multiple ports. Second, a broadcast storm occurs. This is caused by broadcast packets being forwarded in an endless loop between switches. A broadcast storm can consume all available CPU resources and bandwidth.

Spanning tree allows a network design to include spare (redundant) links to provide automatic backup paths if an active link fails, without the danger of bridge loops, or the need for manually enabling/disabling these backup links.

To provide faster spanning tree convergence after a topology change, an evolution of the Spanning Tree Protocol: Rapid Spanning Tree Protocol (RSTP), introduced by IEEE with document 802.1w. RSTP, is a refinement of STP; therefore, it shares most of its basic operation characteristics. This essentially creates a cascading effect away from the root bridge where each designated bridge proposes to its neighbors to determine if it can make a rapid transition. This is one of the major elements which allows RSTP to achieve faster convergence times than STP.

Click the folder **Rapid Spanning Tree** from the **Switch Management** menu and then three options within this folder will be displayed as follows.



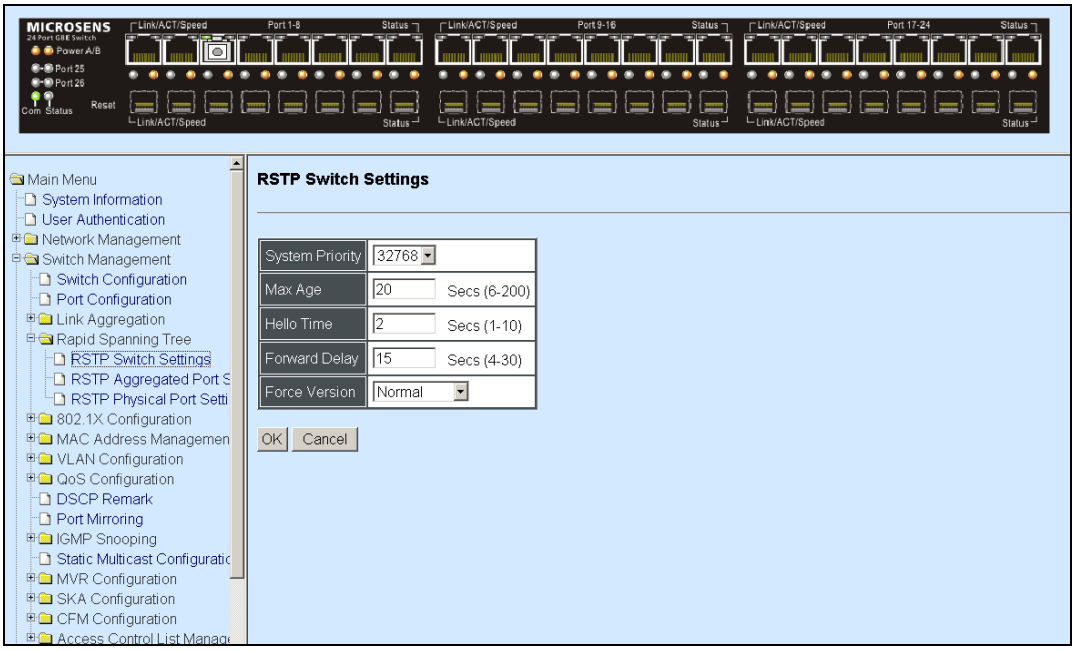
RSTP Switch Settings: Set up system priority, max Age, hello time, etc.

RSTP Aggregated Port Settings: Set up aggregation, path cost, priority, edge, etc.

RSTP Physical Port Settings: Set up physical, ability and edge status of port.

4.4.4.1 RSTP Switch Settings

Click the option **RSTP Switch Settings** from the **Rapid Spanning Tree** menu and then the following screen page appears.



System Priority: Each interface is associated with a port (number) in the STP code. And, each switch has a relative priority and cost that is used to decide what the shortest path is to forward a packet. The lowest cost path is always used unless the other path is down. If you have multiple bridges and interfaces then you may need to adjust the priorities to achieve optimized performance.

The Managed Switch with the lowest priority will be selected as the root bridge. The root bridge is the “central” bridge in the spanning tree.

Max Age: If another switch in the spanning tree does not send out a hello packet for a long period of time, it is assumed to be disconnected. This timeout is set with:

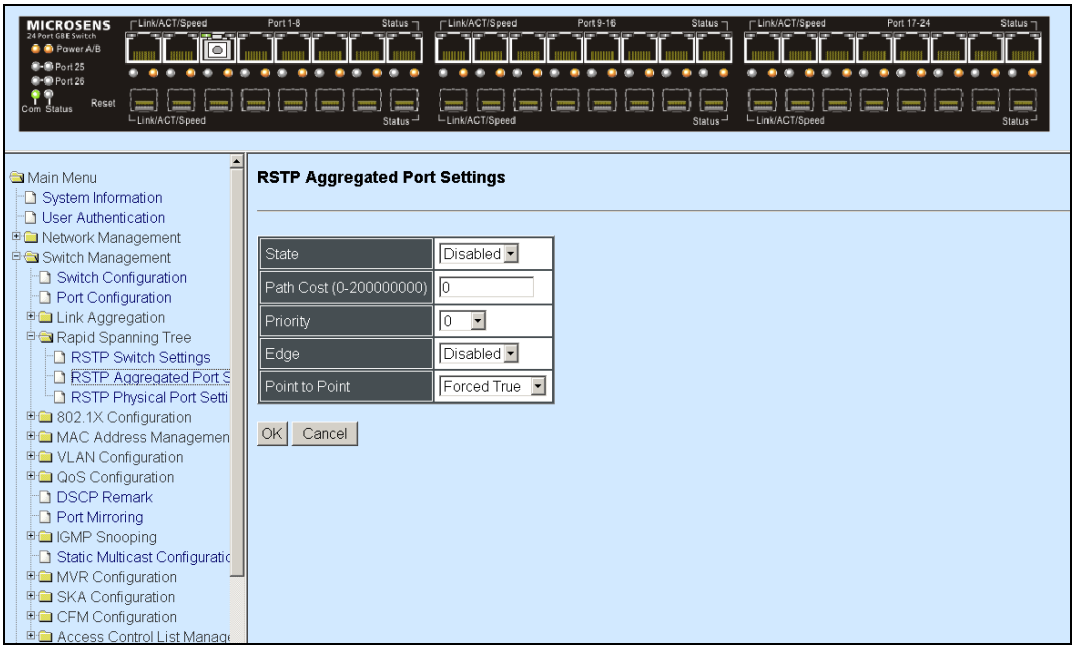
Hello Time: Periodically, a hello packet is sent out by the Root Bridge and the Designated Bridges that are used to communicate information about the topology throughout the entire Bridged Local Area Network.

Forward Delay: It is the time spent in each Listening and Learning state before the Forwarding state is entered. This delay occurs when a new bridge comes onto a busy network.

Force Version: Set and show the RSTP protocol to be used. Normal - use RSTP, Compatible - compatible with STP.

4.4.4.2 RSTP Aggregated Port Settings

Click the option **RSTP Aggregated Port Settings** from the **Rapid Spanning Tree** menu and then the following screen page appears.



State: Enable or disable configured trunking groups in RSTP mode.

Path Cost: This parameter is used by the RSTP to determine the best path between devices. Therefore, lower values should be assigned to ports attached to faster media, and higher values assigned to ports with slower media. 0 means auto-generated path cost.

Priority: Choose a value between 0 and 240 to set the priority for the port interface. A higher priority will designate the interface to forward packets first. A lower number denotes a higher priority.

Edge: Turn On If you know a port is directly connected to an end device (that doesn't support RSTP) then set it as an edge port to ensure maximum performance. This will tell the switch to immediately start forwarding traffic on the port and not bother trying to establish a RSTP connection. Otherwise, turn it off.

Point to Point: “Forced True” parameter indicates a point-to-point (P2P) shared link. P2P ports are similar to edge ports; however, they are restricted in that a P2P port must operate in full duplex. Similar to edge ports, P2P ports transit to a forwarding state rapidly thus benefiting from RSTP.

“Forced False” indicates that the port cannot have P2P status.

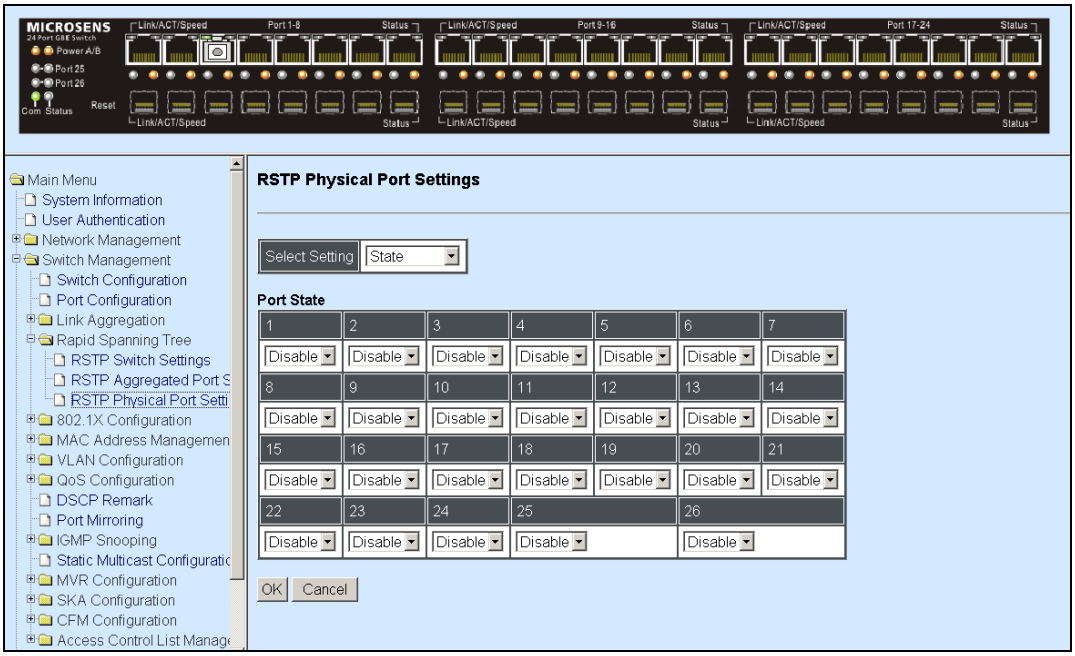
“Auto” allows the port to have P2P status whenever possible and operates as if the P2P status were true. If the port cannot maintain this status, (for example if the port is forced to half-duplex operation) the P2P status changes to operate as if the P2P value were false. The default setting for this parameter is true.

4.4.4.3 RSTP Physical Port Settings

Click the option **RSTP Physical Port Settings** from the **Rapid Spanning Tree** menu and then the following screen page appears.

Configure Port State:

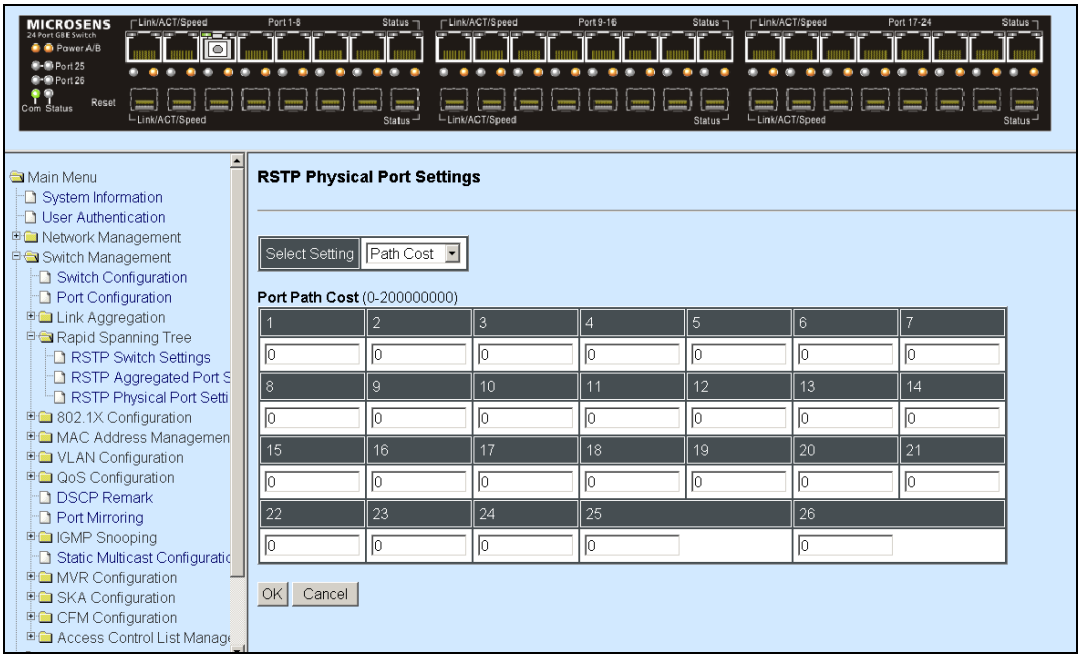
Select “State” from the pull-down menu of Select Setting.



This allows ports to be enabled or disabled. When it is On, RSTP is enabled.

Configure Port Path Cost:

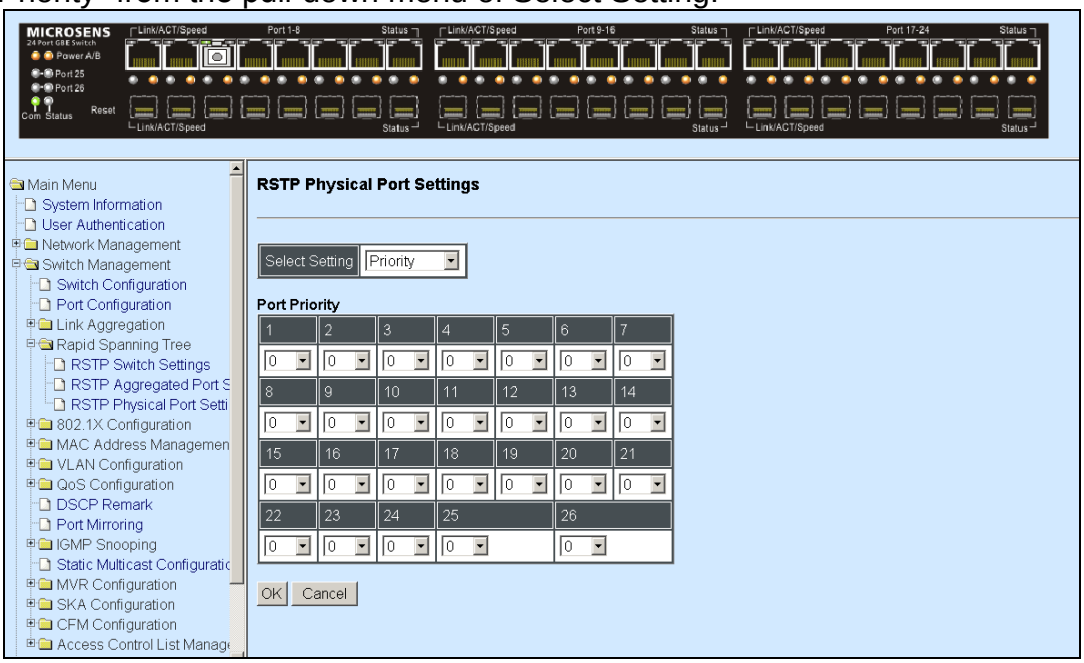
Select “Path Cost” from the pull-down menu of Select Setting.



This sets up each port's path cost. The default value is "0".

Configure Port Priority:

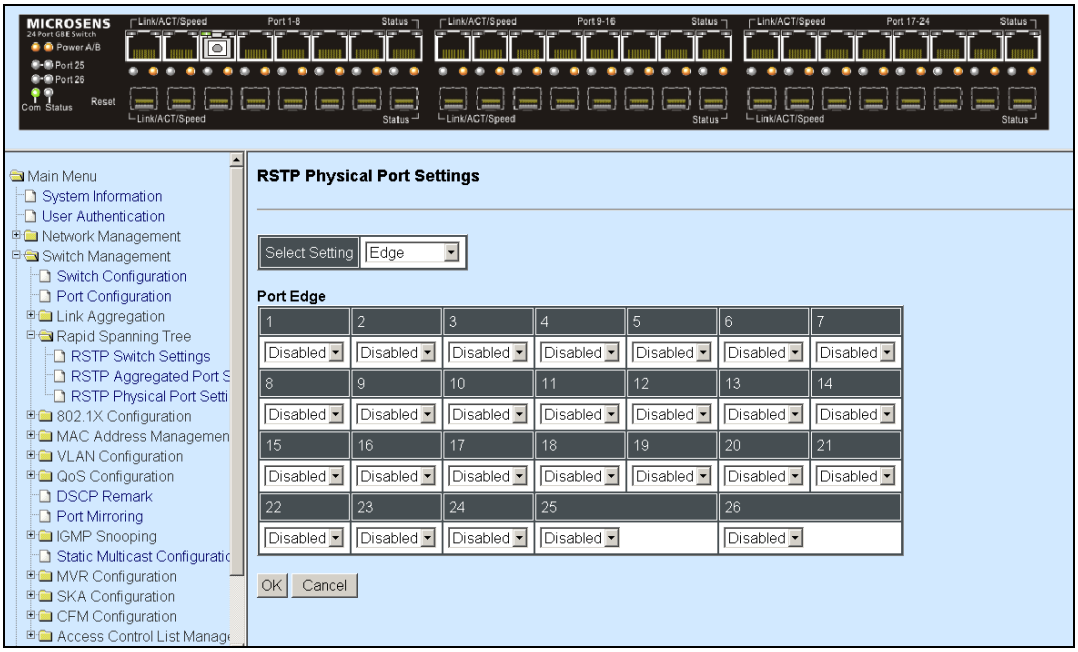
Select "Priority" from the pull-down menu of Select Setting.



You can choose Port Priority value between 0 and 240. The default value is "0".

Configure Port Edge:

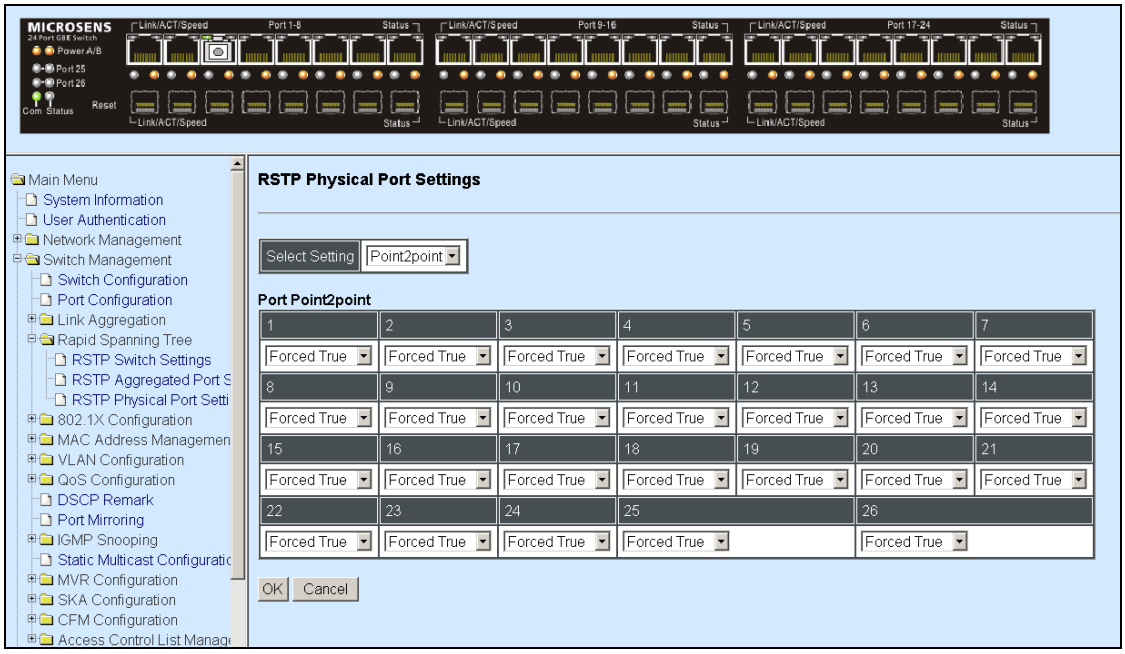
Select "Edge" from the pull-down menu of Select Setting.



Set the port to “enabled” or “disabled”. When it is On, Port Edge is enabled.

Configure Port Point2point:

Select “Point2point” from the pull-down menu of Select Setting.

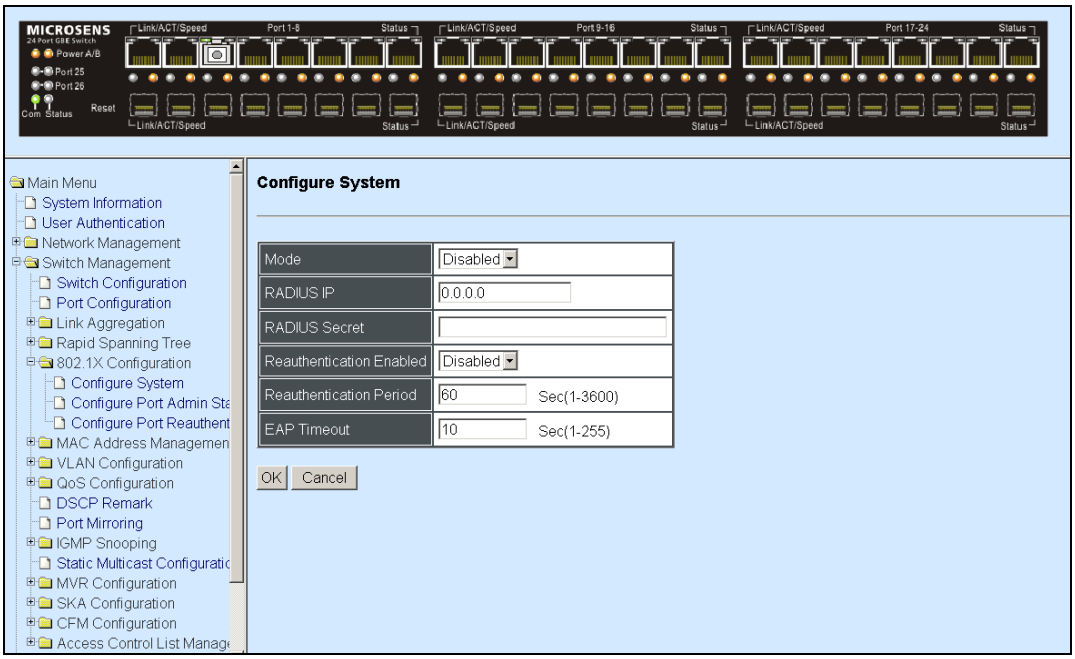


Set up the Point to Point setting. The default setting is “Forced True”.

4.4.5 802.1X Configuration

On 802.1X security-enabled networks, there is a need for non 802.1X supported devices to gain limited access to the network, due to the lack of the proper 802.1X software or incompatible devices, such as computers running Windows 98 or lower operating systems, or the need for guests to gain access to the network without full authorization or local authentication on the Switch.

Click the folder **802.1X Configuration** from the **Switch Management** menu and then three options will be displayed as follows.



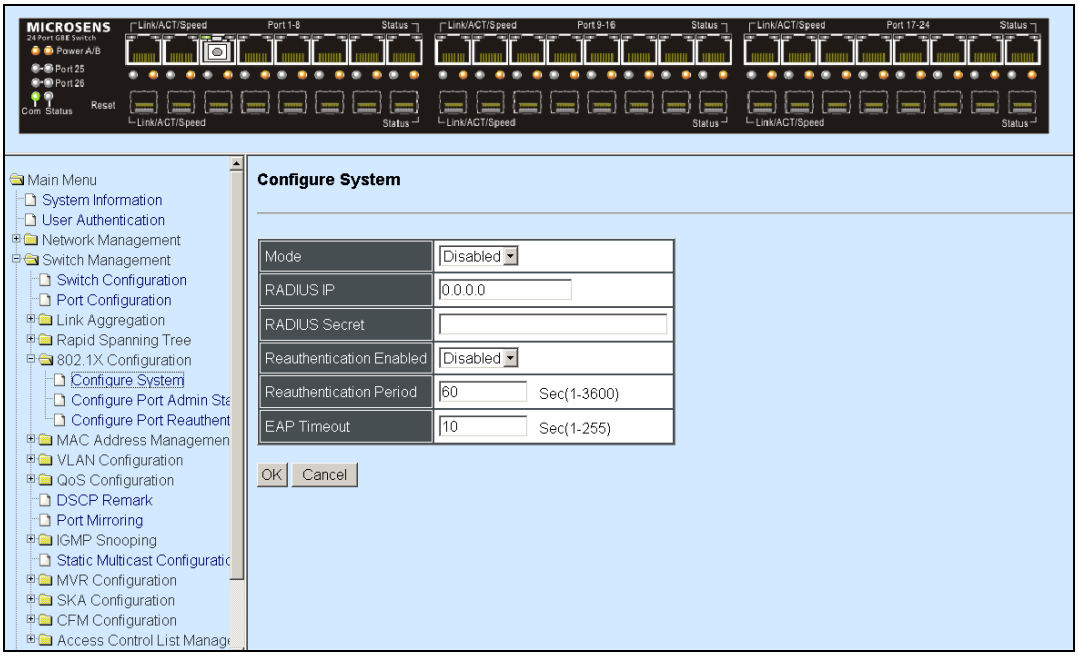
Configure System: Set up 802.1X RADIUS IP, RADIUS Secret, Reauthentication, Timeout.

Configure Port Admin State: Set up aggregation, Path Cost, Priority, Edge, etc.

Configure Port Reauthenticate: Set up Physical, ability and edge status of port.

4.4.5.1 Configure System

Click the option **Configure System** from the **802.1X Configuration** Menu and then the following screen page appears.



Mode: Enable or disable 802.1X for the Managed Switch.

RADIUS IP: RADIUS Authentication server address.

RADIUS Secret: The identification number assigned to each RADIUS authentication server with which the client shares a secret.

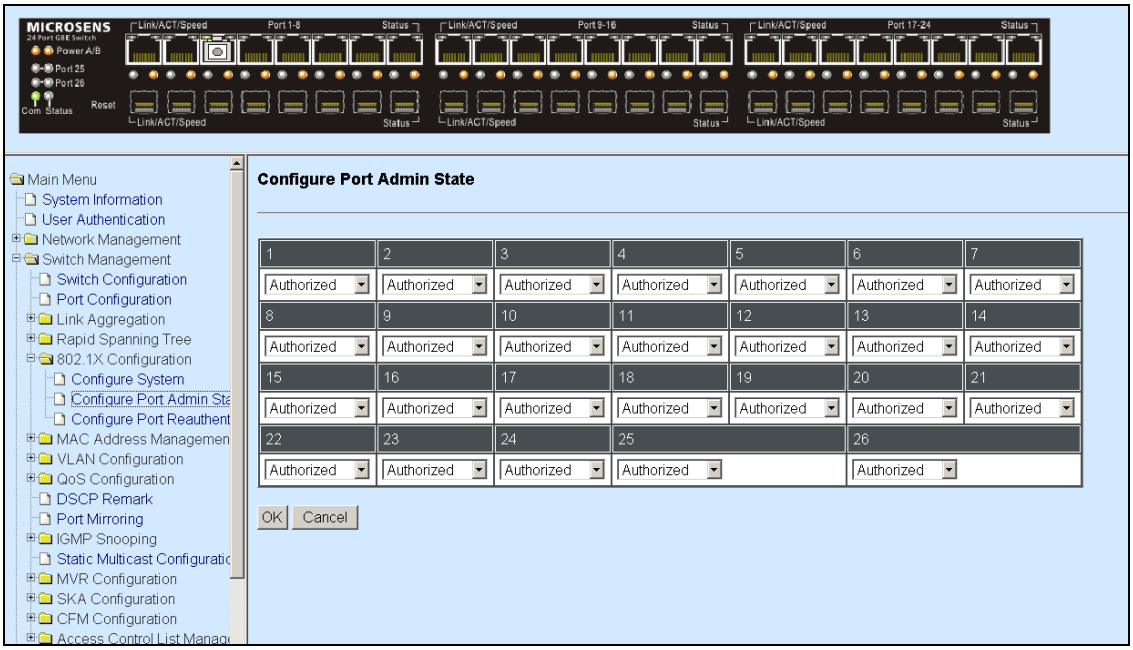
Reauthentication Enabled: To enable or disable Reauthentication.

Reauthentication Period: A constant time that defines a nonzero number of seconds between periodic reauthentication of the client.

EAP Timeout: Enter the time in seconds that the Managed Switch will wait for responses from the server host to an authentication request.

4.4.5.2 Configure Port Admin State

Click the option **Configure Port Admin State** from the **802.1X Configuration** menu and then the following screen page appears.



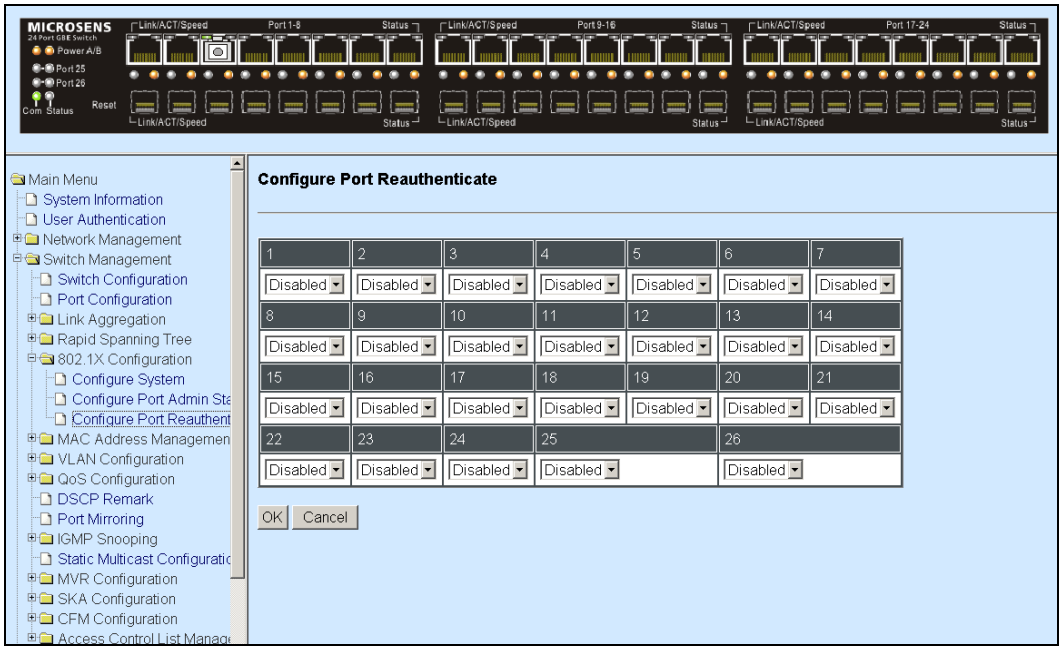
Authorized: This forces the port to grant access to all clients, either dot1x-aware or otherwise. “Authorized” is the default setting.

Unauthorized: This forces the port to deny access to all clients, either dot1x-aware or otherwise.

Auto: This requires a dot1x-aware client to be authorized by the authentication server. Accesses from clients that are not dot1x-aware will be denied.

4.4.5.3 Configure Port Reauthenticate

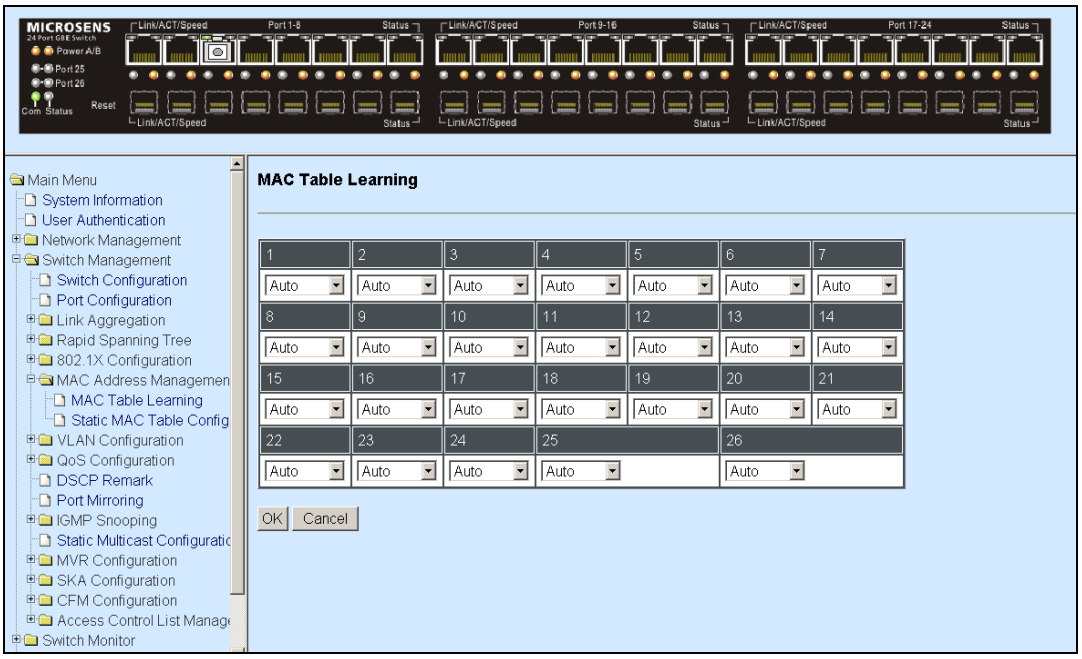
Click the option **Configure Port Reauthenticate** from the **802.1X Configuration** menu and then the following screen page appears.



This allows users to enable or disable port Reauthenticate.

4.4.6 MAC Address Management

Click the folder **MAC Address Management** from the **Switch Management** menu and then the following screen page appears.

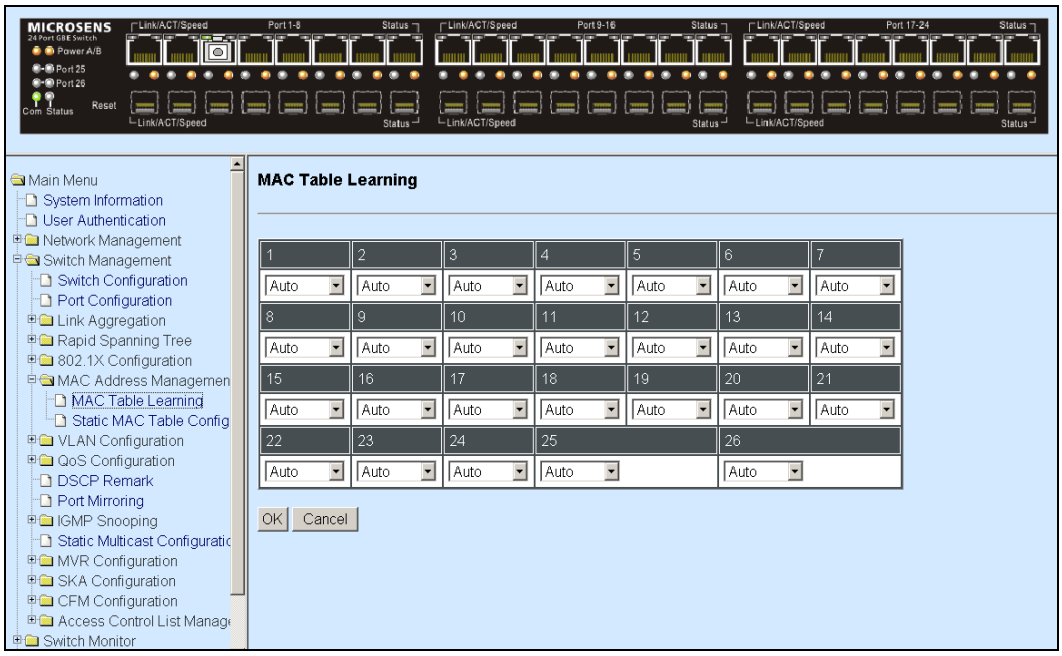


MAC Table Learning: To enable or disable learning MAC address function.

Static MAC Table Configuration: To create, edit or delete Static MAC Table setting.

4.4.6.1 MAC Table Learning

Click the option **MAC Table Learning** from the **MAC Address Table** menu and then the following screen page appears.

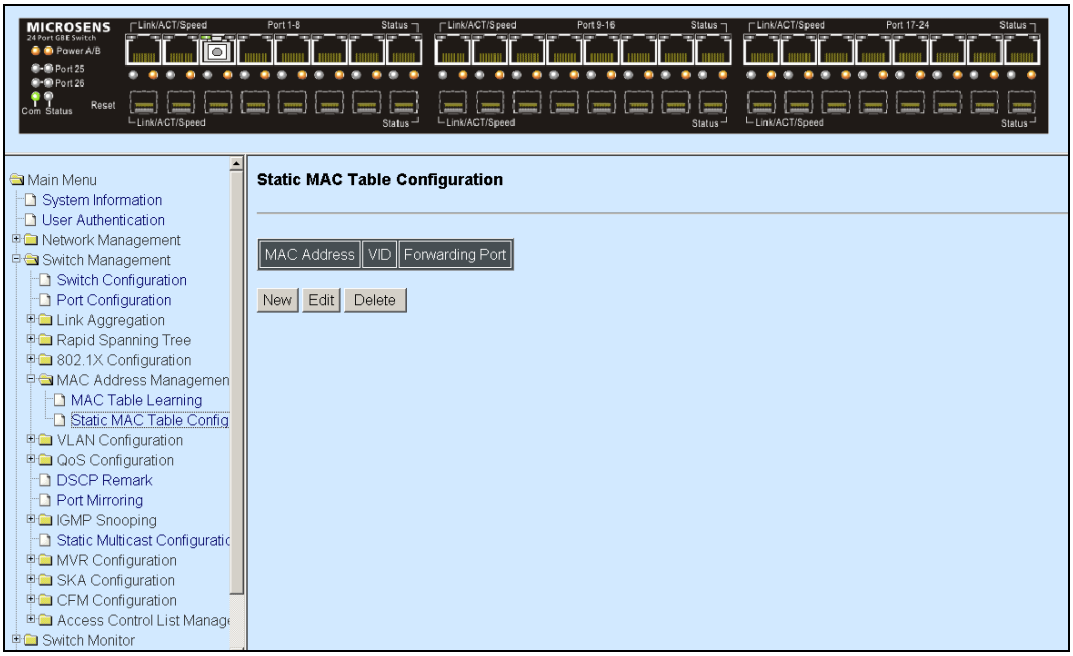


Auto: To enable the port learning MAC address.

Disabled: To disable port learning MAC address.

4.4.6.2 Static MAC Table Configuration

Click the option **Static MAC Table Configuration** from the **MAC Address Table** menu and then the following screen page appears.

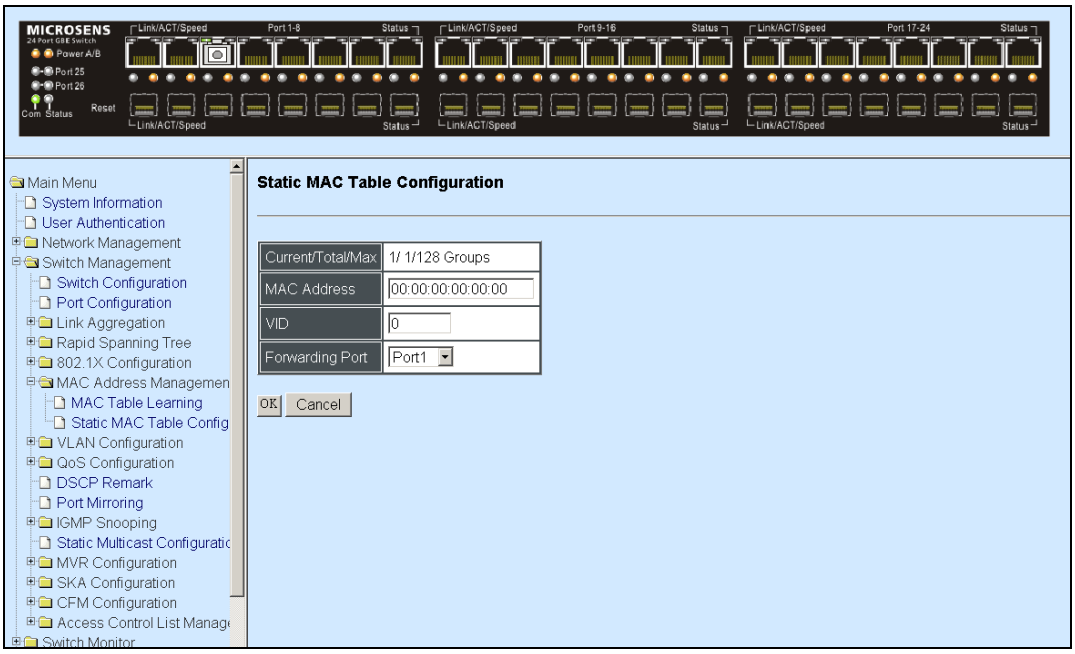


Note: *The Managed Switch only supports switch-based MAC security and does not support port-based MAC security. The Managed Switch can support up to 128 entries of MAC security list.*

Click **New** to add a new MAC address entity and then the following screen page appears.

Click **Edit** to view and edit the selected MAC address entity.

Click **Delete** to remove a MAC address entity.



Current/Total/Max: The number of current, total and maximum MAC address entry or entries.

MAC Address: Specify a destination MAC address in the packet.

VID: Specify the VLAN where the packets with the Destination MAC address can be forwarded.

Forwarding Port: If the incoming packet has the same destination MAC address as the one specified in VID, it will be forwarded to the selected port directly.

4.4.7 VLAN Configuration

A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLAN can be used to combine any collections of LAN segments into a group that appears as a single LAN. VLAN also logically segments the network into different broadcast domains. All broadcast, multicast, and unknown packets entering the Switch on a particular VLAN will only be forwarded to the stations or ports that are members of that VLAN.

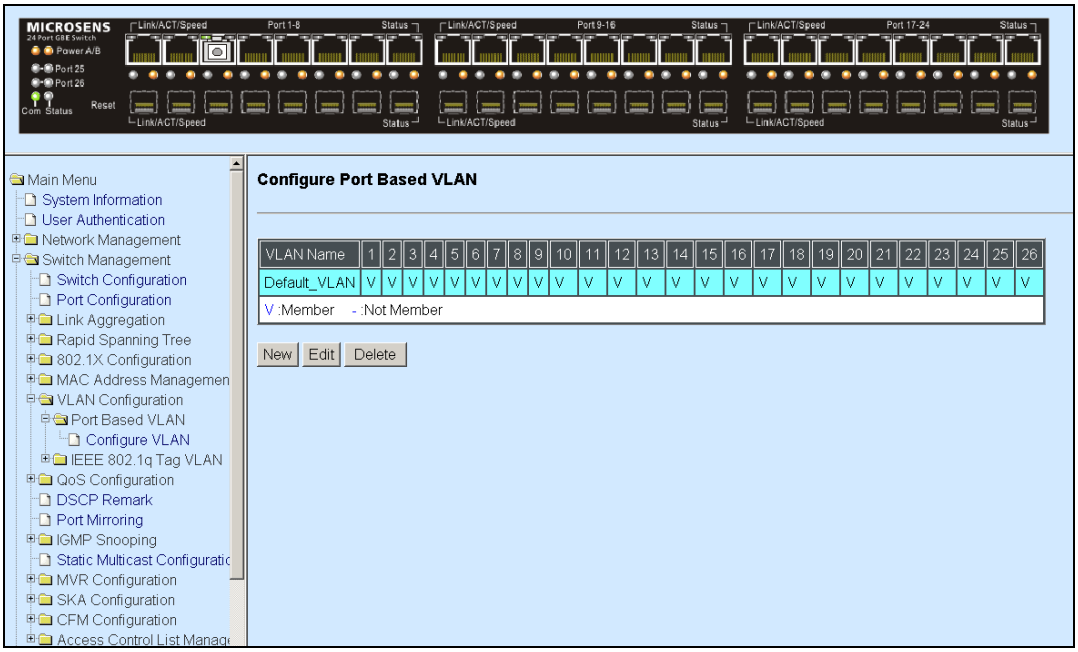
VLAN can enhance performance by conserving bandwidth and improve security by limiting traffic to specific domains. A VLAN is a collection of end nodes grouped by logics instead of physical locations. End nodes that frequently communicate with each other are assigned to the same VLAN, no matter where they are physically located on the network. Another benefit of VLAN is that you can change the network topology without physically moving stations or changing cable connections. Stations can be 'moved' to another VLAN and thus communicate with its members and share its resources, simply by changing the port VLAN settings from one VLAN to another. This allows VLAN to accommodate network moves, changes and additions with the greatest flexibility.

The Managed Switch supports two types of VLAN, these are: **Port-Based VLAN (26 sets)** and **802.1Q Tag VLAN (128 sets)**.

4.4.7.1 Port-Based VLAN

Port-based VLAN can effectively segment one network into several broadcast domains, Broadcast/Multicast and unknown packets will be limited to within the VLAN. Port-Based VLAN is uncomplicated and fairly rigid in implementation and is useful for network administrators who wish to quickly and easily set up VLAN so as to isolate the effect of broadcast packets on their network.

The following screen page appears when you choose **Port-Based VLAN** mode and then select **Configure VLAN**.

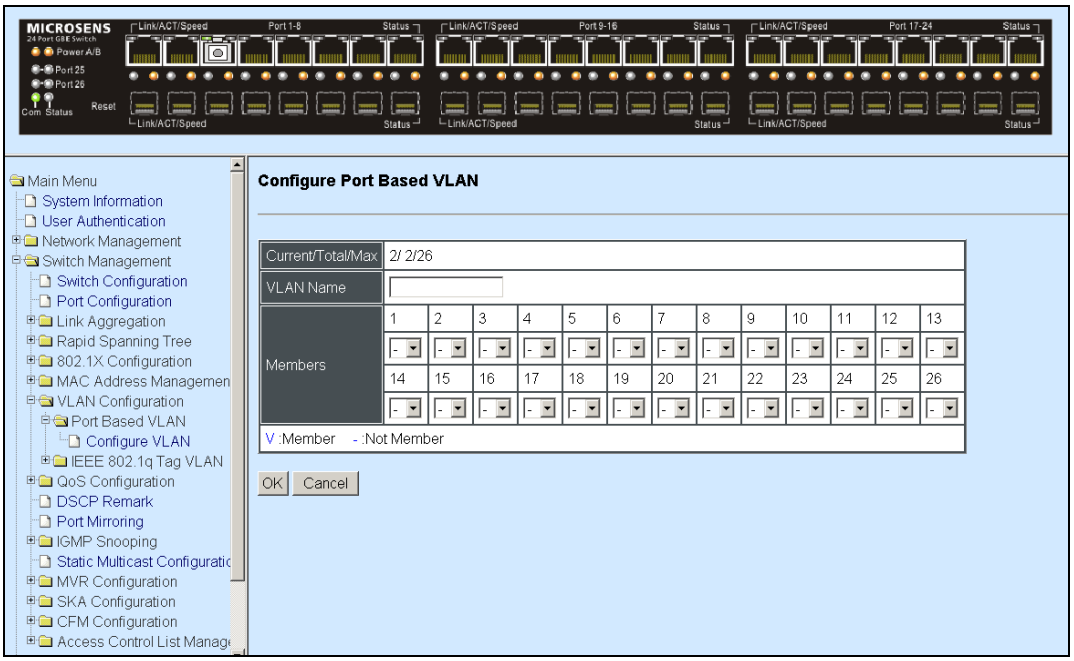


Since the destination address and sources address of the packets are listed in MAC address table of specific VLAN (except broadcast/multicast packets), in every VLAN the traffic between two ports will be two-way without restrictions.

Click **New** to add a new VLAN entity and then the following screen page appears.

Use **Edit** to view and edit the current VLAN setting.

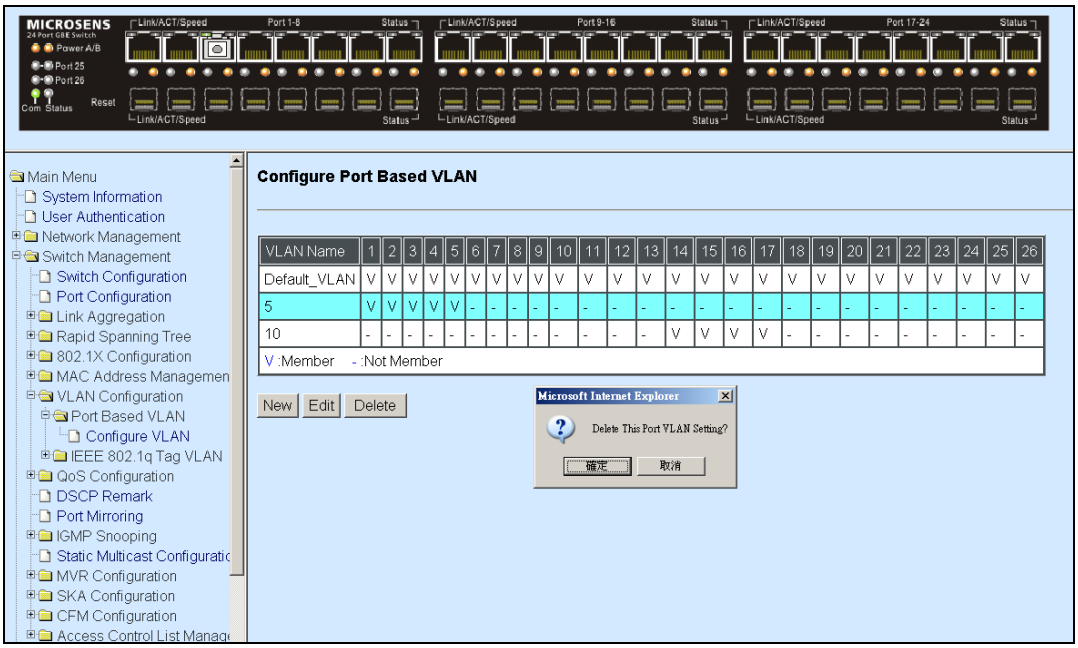
Click **Delete** to remove a VLAN entity.



VLAN Name: Use the default name or specify a VLAN name.

VLAN Members: If you select “V” from the pull-down menu, it denotes that the port selected belongs to VLAN.

Click **Delete** to remove the selected Port-Based VLAN rule and then the following screen page appears.



4.4.7.2 802.1Q VLAN Concept

Port-Based VLAN is simple to implement and use, but it cannot deploy cross switches VLAN. The 802.1Q protocol was developed in order to provide the solution. By tagging VLAN membership information to Ethernet frames, the IEEE 802.1Q can help network administrators break large switched networks into smaller segments so that broadcast and multicast traffic will not occupy too much available bandwidth as well as provide a higher level security between segments of internal networks.

The 802.1Q frame format is shown below.

PRE	SFD	DA	SA	TCI	P	C	VID	T/L	Payload	FCS

PRE	Preamble	62 bits Used to synchronize traffic
SFD	Start Frame Delimiter	2 bits Marks the beginning of the header
DA	Destination Address	6 bytes The MAC address of the destination
SA	Source Address	6 bytes The MAC address of the source
TCI	Tag Control Info	2 bytes set to 8100 for 802.1p and Q tags
P	Priority	3 bits Indicates 802.1p priority level 0-7
C	Canonical Indicator	1 bit Indicates if the MAC addresses are in Canonical format - Ethernet set to "0"
VID	VLAN Identifier	12 bits Indicates the VLAN (0-4095)
T/L	Type/Length Field	2 bytes Ethernet II "type" or 802.3 "length"
Payload		< or = 1500 bytes User data
FCS	Frame Check Sequence	4 bytes Cyclical Redundancy Check

Important VLAN Concepts for Configuration

There are two key concepts to understand.

- The Default Port VLAN ID (**PVID**) specifies the VID to the switch port that will assign the VID to untagged traffic from that port.
- The VLAN ID (**VID**) specifies the set of VLAN that a given port is allowed to receive and send **labeled** packets.

Both variables can be assigned to a switch port, but there are significant differences between them. An administrator can only assign one PVID to each switch port (since the 802.1Q protocol assigns any single packet to just one VLAN). The PVID defines the default VLAN ID tag that will be added to un-tagged frames receiving from that port (ingress traffic).

On the other hand, a port can be defined as a member of multiple VLAN (multiple VID). These VIDs constitute an access list for the port. The access list can be used to filter tagged ingress traffic (the switch will drop a tagged packet tagged as belonging in one VLAN if the port on which it was received is not a member of that VLAN). The switch also consults the access list to filter packets it sends to that port (egress traffic). Packets will not be forwarded unless they belong to the VLANs that the port is one of the members.

The differences between **Ingress** and **Egress** configurations can provide network segmentation. Moreover, they allow resources to be shared across more than one VLAN.

Important VLAN Definitions

Ingress

The point at which a frame is received on a switch and the switching decisions must be made. The switch examines the VID (if present) in the received frames header and decides whether or not and where to forward the frame. If the received frame is untagged, the switch will tag the frame with the PVID for the port on which it was received. It will then use traditional Ethernet bridging algorithms to determine the port to which the packet should be forwarded.

Next, it checks to see if each destination port is on the same VLAN as the PVID and thus can transmit the frame. If the destination port is a member of the VLAN used by the ingress port, the frame will be forwarded. If the received frame is tagged with VLAN information, the switch checks its address table to see whether the destination port is a member of the same VLAN. Assuming both ports are members of the tagged VLAN, the frame will be forwarded.

Ingress Filtering

The process of checking an incoming frame and comparing its VID with the ingress port VLAN membership is known as Ingress Filtering.

On the Managed Switch, it can be either enabled or disabled.

1. When an **untagged** frame is received, the **ingress** port **PVID** will be applied to the frame.

2. When a **tagged** frame is received, the **VID** in the frame tag is used.

When Ingress Filtering is “Enabled”, the Managed Switch will first determine,

1. If the **ingress** port itself is a member of the frame VLAN, it will receive the frame.
2. If the **ingress** port is not a member of the frame VLAN, the frame will be dropped.
3. If it is a member of that VLAN, the Managed Switch then checks its address table to see whether the destination port is a member of the same VLAN. Assuming both ports are members of that VLAN, the frame will be forwarded.

Administrators should make sure that each port’s **PVID** is set up; otherwise, incoming frames may be dropped if **Ingress Filtering** is enabled. On the other hand, when Ingress Filtering is disabled, the Managed Switch will not compare the incoming frame **VID** with the **ingress** port VLAN membership. It will only check its address table to see whether the destination VLAN exists.

1. If the VLAN is unknown, it will be broadcasted.
2. If the VLAN and the destination MAC address are known, the frame will be forwarded.
3. If the VLAN is known and the destination MAC address is unknown, the frame will be flooded to all ports in the VLAN.

Tagging

Every port on an 802.1Q compliant switch can be configured as tagging or un-tagging.

Ports with taggings Enable will put the VID number, priority and other VLAN information into the header of all packets that flow into and out of it. If a packet has been tagged previously, the port will not alter the packet and keep the VLAN information intact. The VLAN information in the tag can then be used by other 802.1Q compliant devices on the network to make packet forwarding decisions.

Un-tagging

Ports with un-taggings Enable will strip the 802.1Q tag from all packets that flow into and out of those ports. If the packet does not have an 802.1Q VLAN tag, the port will not alter the packet. Thus, all packets received by and forwarded by an un-tagging port will have no 802.1Q VLAN information. (Remember that the PVID is only used internally within the switch). Un-tagging is used to send packets from an 802.1Q-compliant network device to a non-compliant network device. Simply put, un-tagging means that once you set up the port as “**U**” (untagged), all egress packets (in the same VLAN group) from the port will have no tags.

VLAN-Aware

Packets that are tagged (carrying the 802.1Q VID information) can be transmitted from one 802.1Q compliant network device to another one with the VLAN information intact. This allows 802.1Q VLANs to span network devices (and indeed, the entire network, if all network devices are 802.1Q compliant).

Unfortunately, not all network devices are 802.1Q compliant. These devices are referred to VLAN-unaware. 802.1Q devices are referred to VLAN-aware.

Prior to the adoption of 802.1Q VLANs, port-based and MAC-based VLANs were in common use. These VLANs relied upon a Port VLAN ID (PVID) to forward packets. A packet received on a given port would be assigned that port's PVID and then be forwarded to the port corresponding to the packet's destination address (found in the Switch's forwarding table). If the PVID of the port that received the packet different from the PVID of the port that transmits the packet, the Managed Switch will drop the packet.

Within the Managed Switch, different PVIDs mean different VLANs (remember that two VLANs cannot communicate without an external router). Therefore, VLAN identification based upon the PVIDs cannot create VLANs that extend outside a given switch (or switch stack).

Every physical port on a switch has a PVID. 802.1Q ports are also assigned a PVID for use within the Switch. If no VLANs are defined on the Managed Switch, all ports are then assigned to a default VLAN with a PVID equal to 1. Untagged packets are assigned the PVID of the port on which they were received. Forwarding decisions are based upon this PVID, in so far as VLANs are concerned. Tagged packets are forwarded according to the VID contained within the tag. A PVID is assigned to the tagged packet, but the PVID is not used to make packet-forwarding decisions, the VID is.

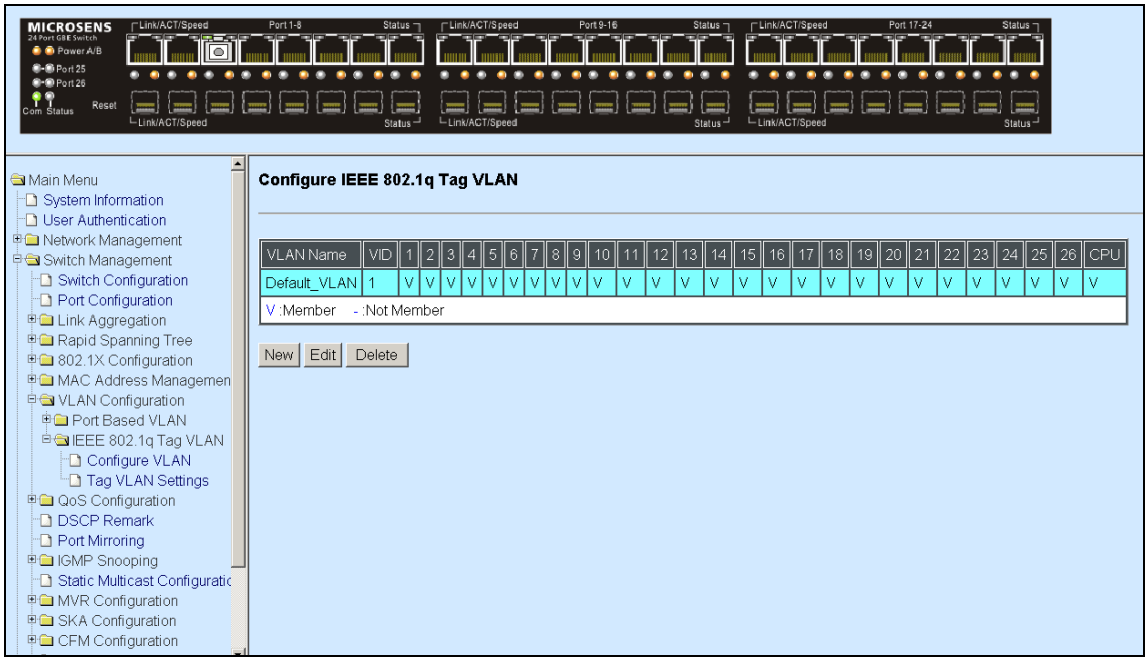
VLAN-aware switches must keep a table so as to relate PVIDs within the Switch to VIDs on the network. The Managed Switch will compare the VID of a packet to be transmitted with the VID of the port that is to transmit the packet. If the two VIDs are different, the Managed Switch will drop the packet because the existence of the PVID for untagged packets and the VID for tagged packets, VLAN-aware and VLAN-unaware network devices can coexist on the same network.

A switch port can only have one PVID; however, it can have as many VIDs as the Switch has memory in its VLAN table to store them.

Because some devices on a network may be VLAN-unaware, a decision must be made at each port on a VLAN-aware device before packets are transmitted - should the packet to be transmitted have a tag or not? If the transmitting port is connected to a VLAN-unaware device, the packet should be untagged. If the transmitting port is connected to a VLAN-aware device, the packet should be tagged.

4.4.7.3 802.1Q VLAN

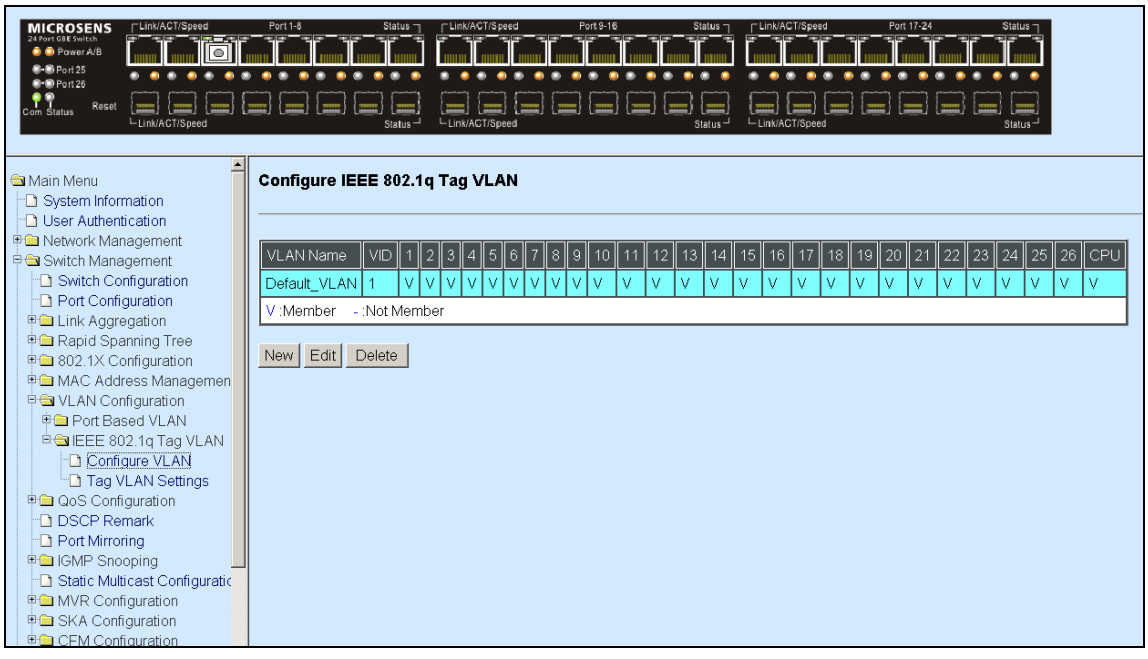
The following screen page appears when you choose **IEEE 802.1q Tag VLAN**.



Configure VLAN: To create, edit or delete 802.1Q Tag VLAN settings.

Tag VLAN Setting: To set up VLAN-Aware, Ingress Filter, Frame Type, Port VLAN ID, Port Egress Mode.

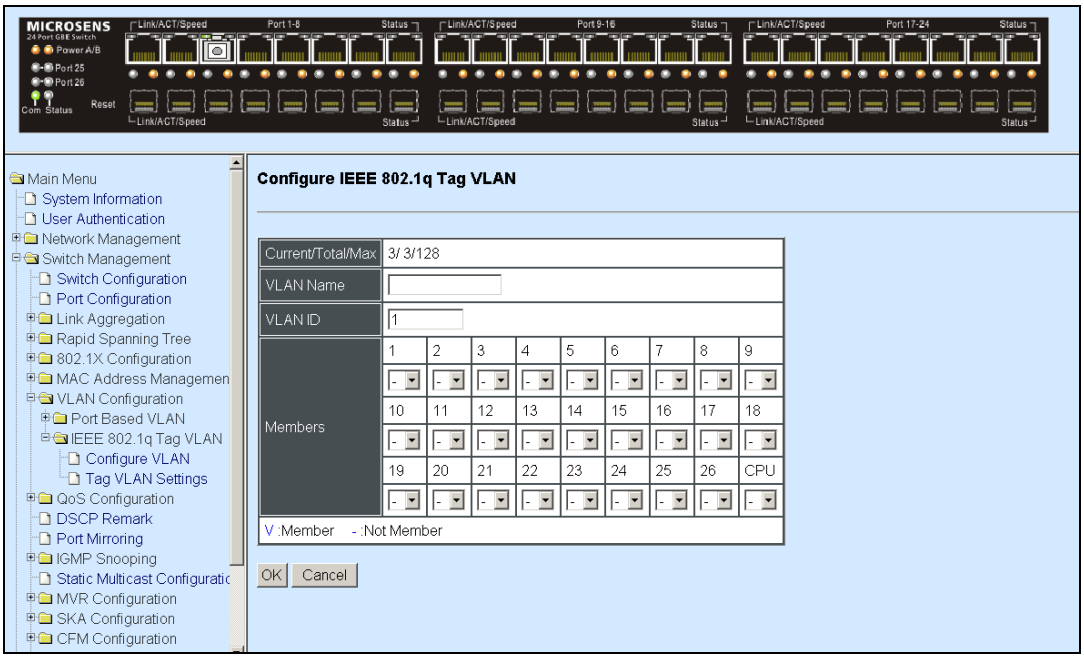
4.4.7.3.1 Configure VLAN



Click **New** to add a new VLAN entity an then the following screen page appears.

Click **Edit** to view and edit current IEEE 802.1Q Tag VLAN setting.

Click **Delete** to remove a VLAN entity.



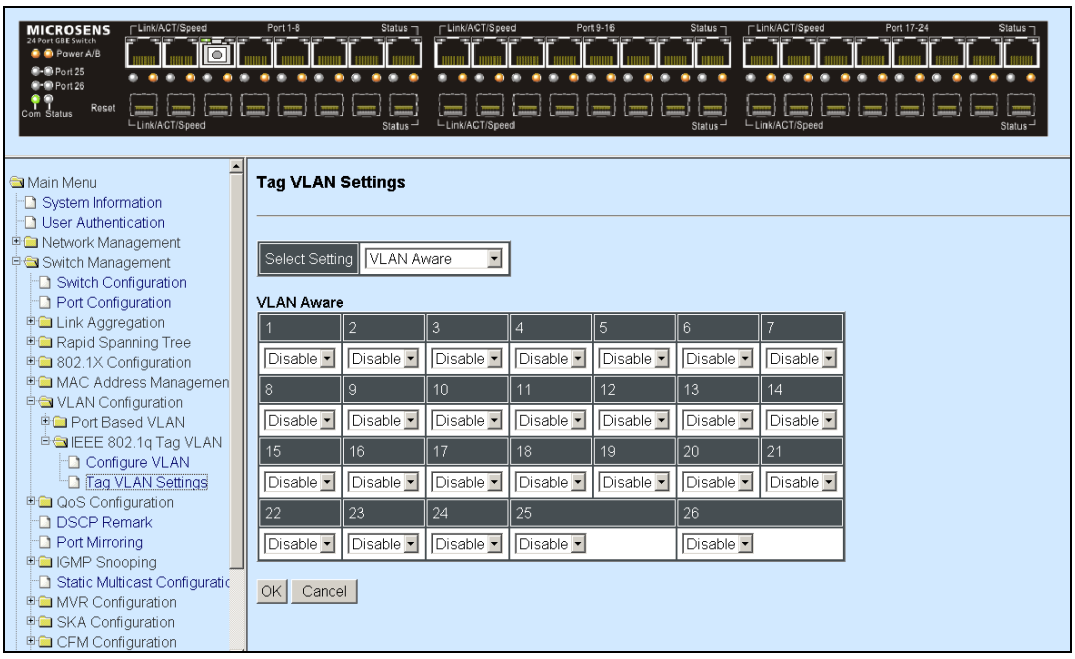
VLAN ID: Specify a VLAN ID between 1 and 4094.

VLAN Name: Use the default name or specify a VLAN name.

VLAN Members: If you select “V” from the pull-down menu in each port, it denotes that the ports selected belong to VLAN.

4.4.7.3.2 Configure VLAN Aware

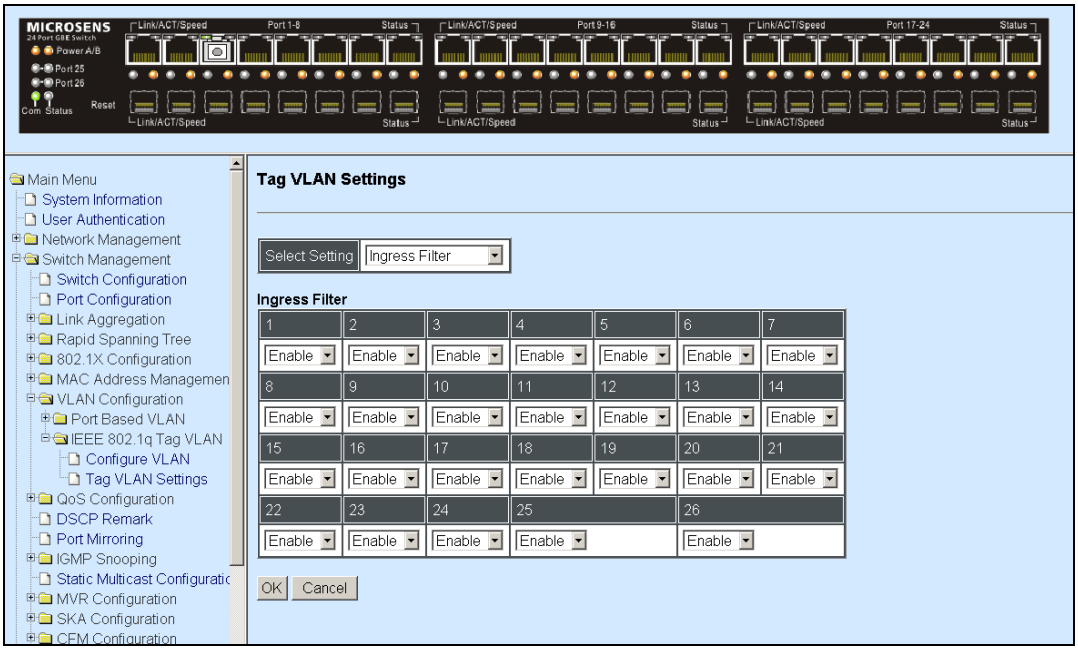
The following screen page appears if you choose **Tag VLAN Settings** and then select **VLAN Aware** from the pull-down menu of Select Setting.



Click the pull-down menu to select “Enable” or “Disable”. The default setting is disabled to all ports.

4.4.7.3.3 Configure Ingress Filter

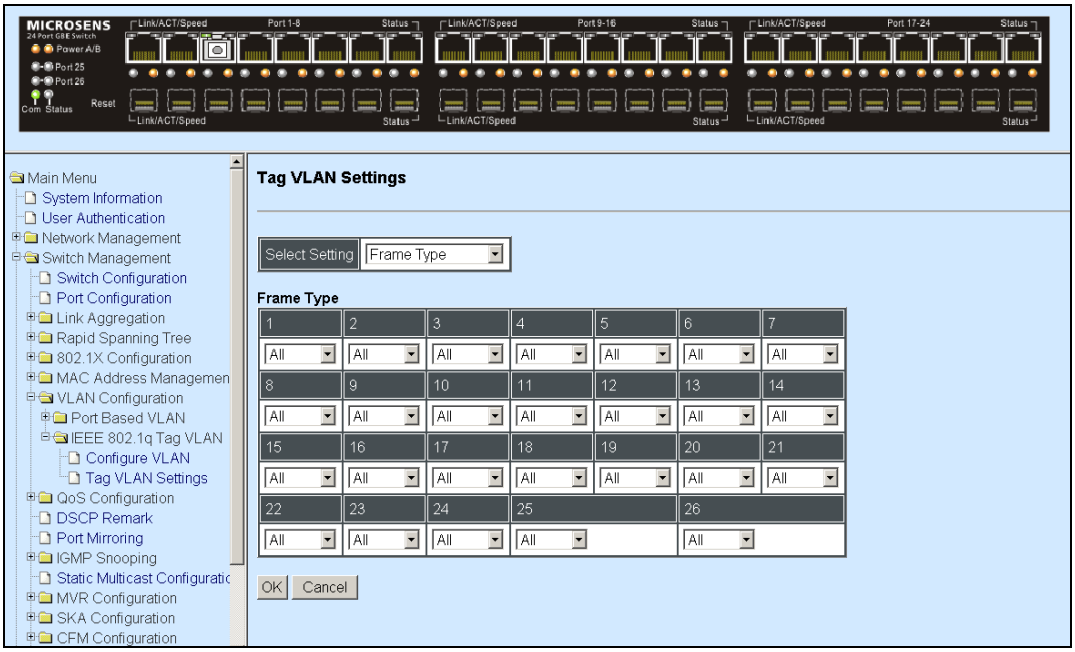
The following screen page appears when you choose **Tag VLAN Settings** and then select **Ingress Filter** from the pull-down menu of Select Setting.



Click the pull-down menu to select “Enable” or “Disable”. The default setting is enabled to all ports.

4.4.7.3.4 Configure Frame Type

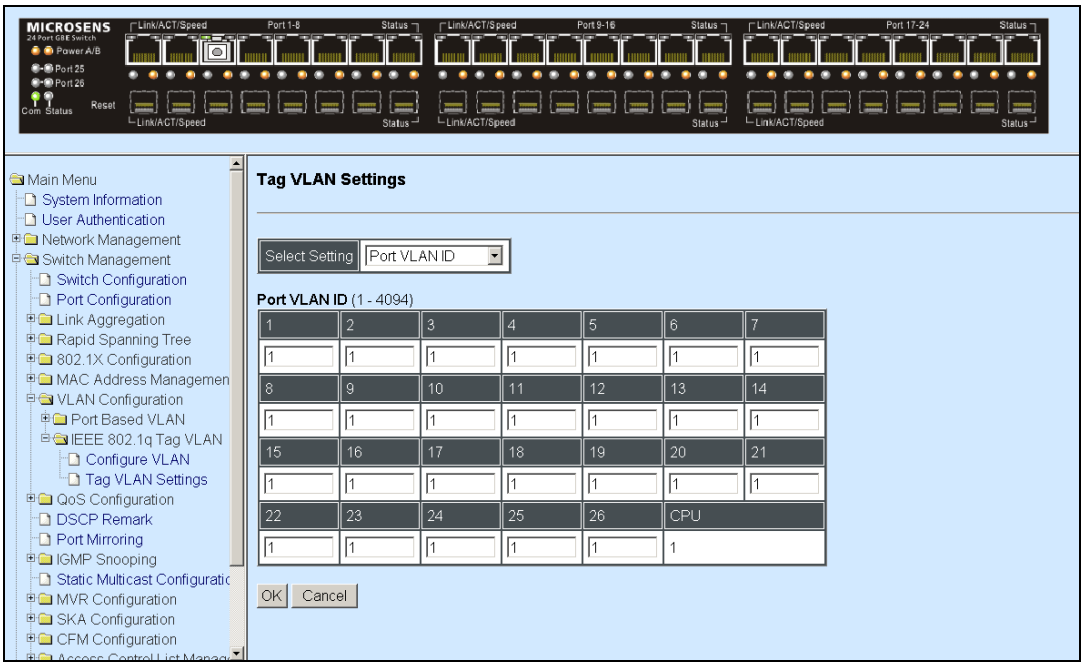
The following screen page appears if you choose **Tag VLAN Settings** and then select **Frame Type** from the pull-down menu of Select Setting.



Frame Type: Two frame types are available, these are “All” or “Tagged”. The default setting is “All” to all ports. “Tagged” means that the port will only send and receive VLAN-tagged packets. When ports are set to “All”, they will send and receive both VLAN-tagged and untagged packets.

4.4.7.3.5 Configure Port VLAN ID

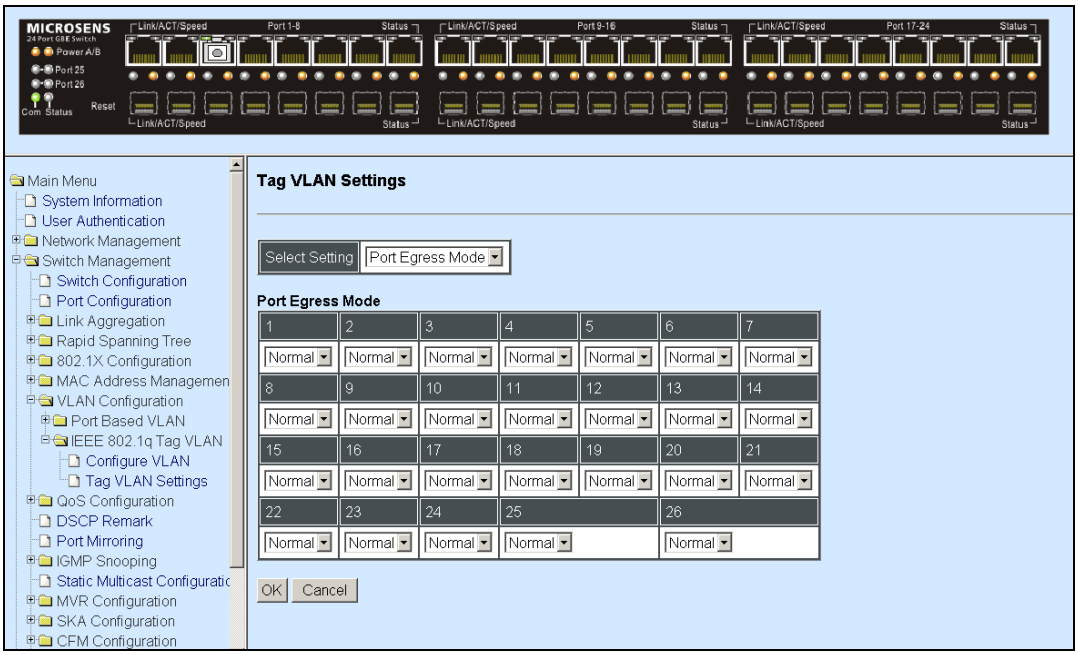
The following screen page appears if you choose **Tag VLAN Settings** and then select **Port VLAN ID** from the pull-down menu of Select Setting.



Port VLAN ID (PVID): The range of PVID is between 1 and 4094. VLAN ID will be assigned to untagged frames received on the interface. The default setting is 1.

4.4.7.3.6 Configure Port Egress Mode

The following screen page appears if you choose **Tag VLAN Settings** and then select **Port Egress Mode** from the pull-down menu of Select Setting.

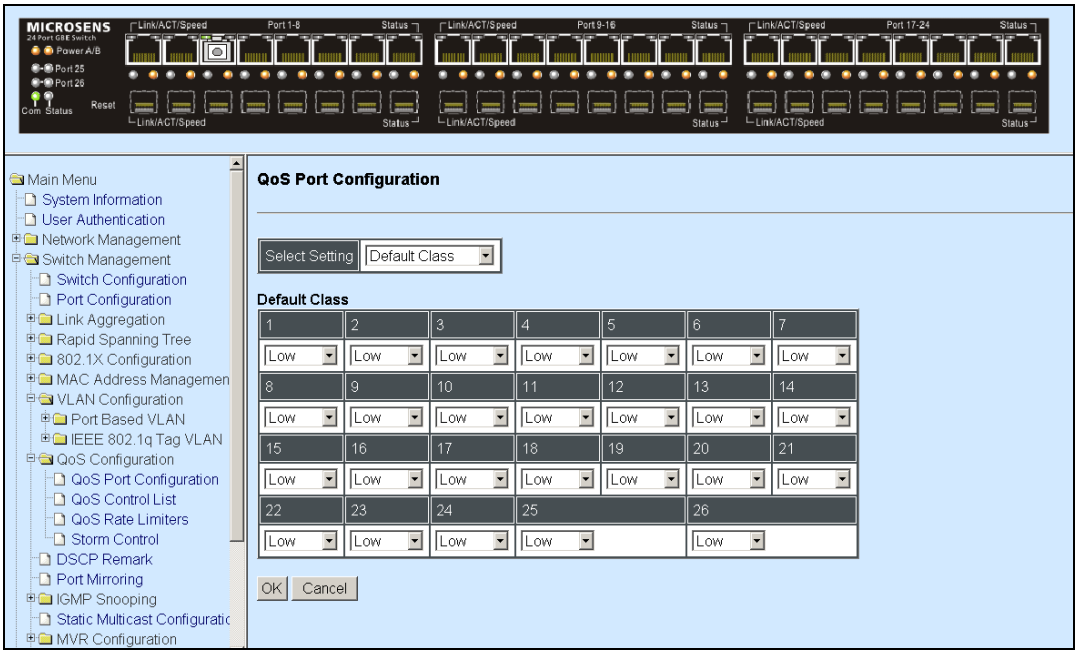


Choose either “Normal” or “Untag” option from the pull-down menu for Port Egress mode. The default setting is “Normal” to all ports.

4.4.8 QoS Configuration

Network traffic is always unpredictable and the only basic assurance that can be offered is the best effort traffic delivery. To overcome this challenge, Quality of Service (QoS) is applied throughout the network. This ensures that network traffic is prioritized according to specified criteria and receives preferential treatments.

QoS enables you to assign various grades of network service to different types of traffic, such as multi-media, video, protocol-specific, time critical, and file-backup traffic. To set up the priority of packets in the Managed Switch, click the folder **QoS Priority Configuration** from the **Switch Configuration** menu and then four options within this folder will be displayed.



QoS Port Configuration: To set up each port's QoS default class, QCL, Priority, Queuing Mode, Queue Weighted.

QoS Control List: To create, edit or delete QCL settings.

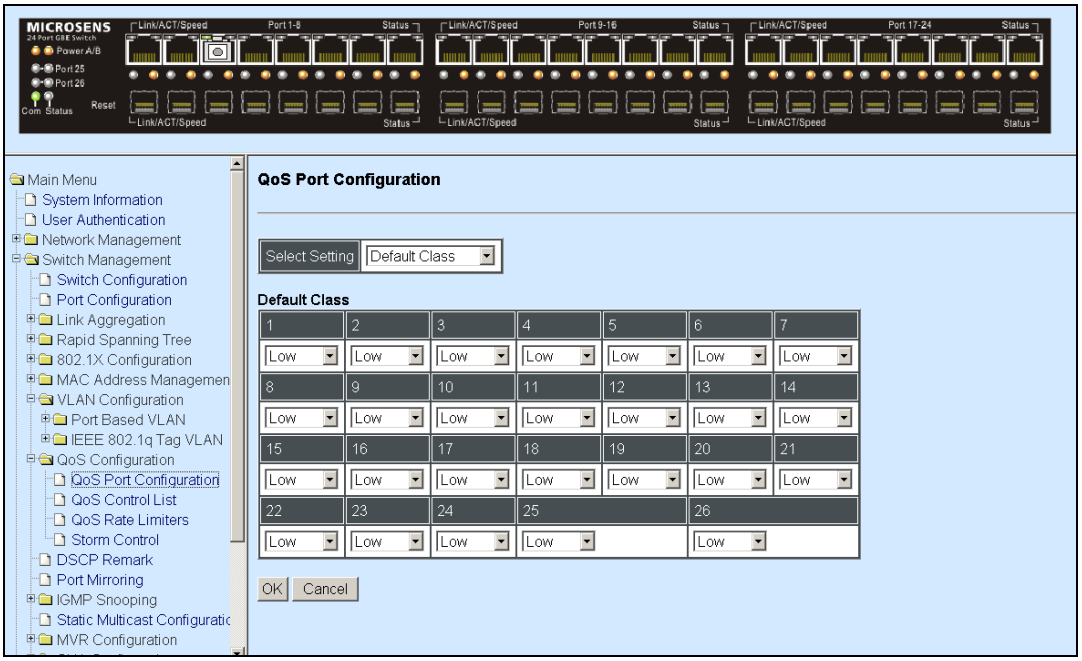
QoS Rate Limiters: To configure each port's Policer and Shaper Rate.

Storm Control: To enable or disable Storm Control.

4.4.8.1 QoS Port Configuration

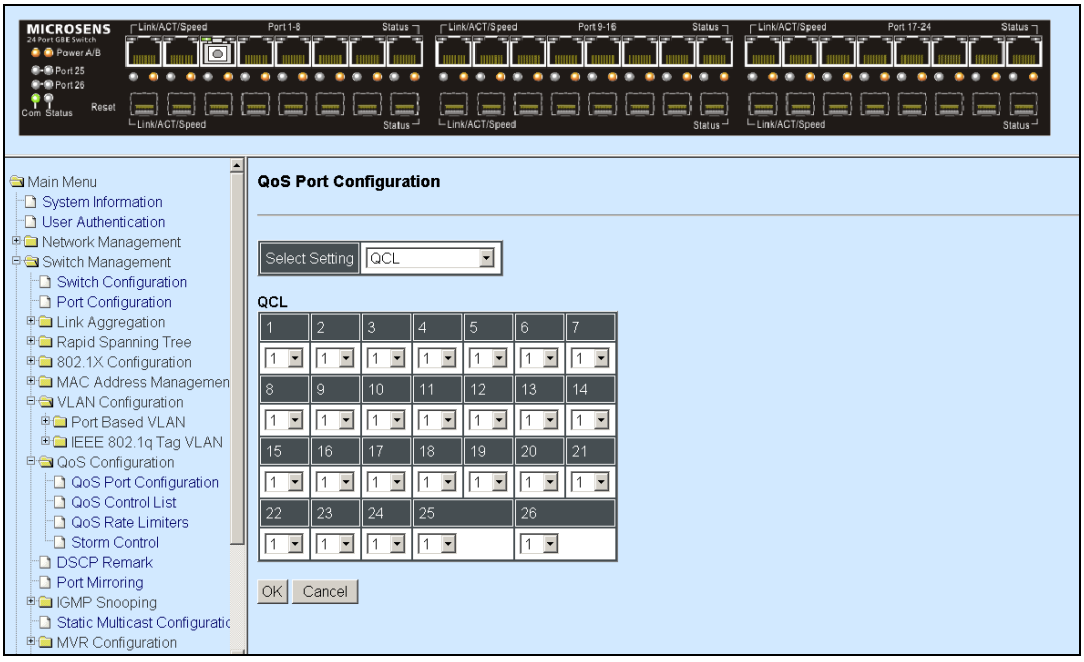
Select the option **QoS Port configuration** from the **QoS Configuration** menu and then the following screen page appears.

Configure Default Class:



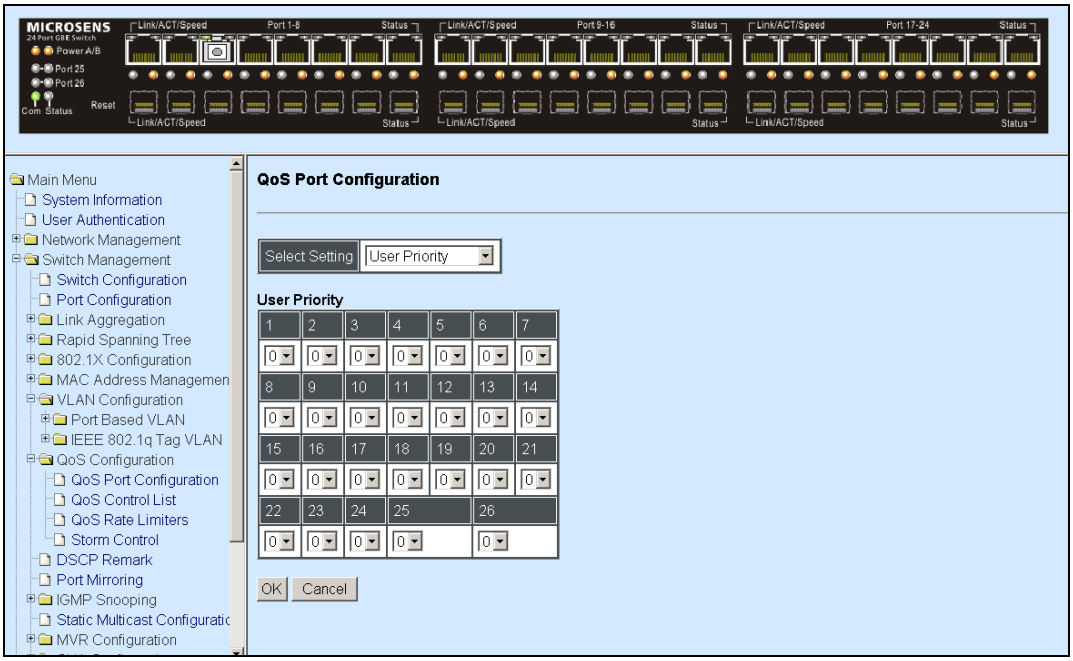
Click the pull-down menu to choose the class level “Low”, “Normal”, “Medium” or “High”. The default class level of each port is “Low”.

Configure QCL:



A QCL number is assigned to each port based on the information in the QCL table. Please refer to QoS Control List for QCL settings.

Configure User Priority:

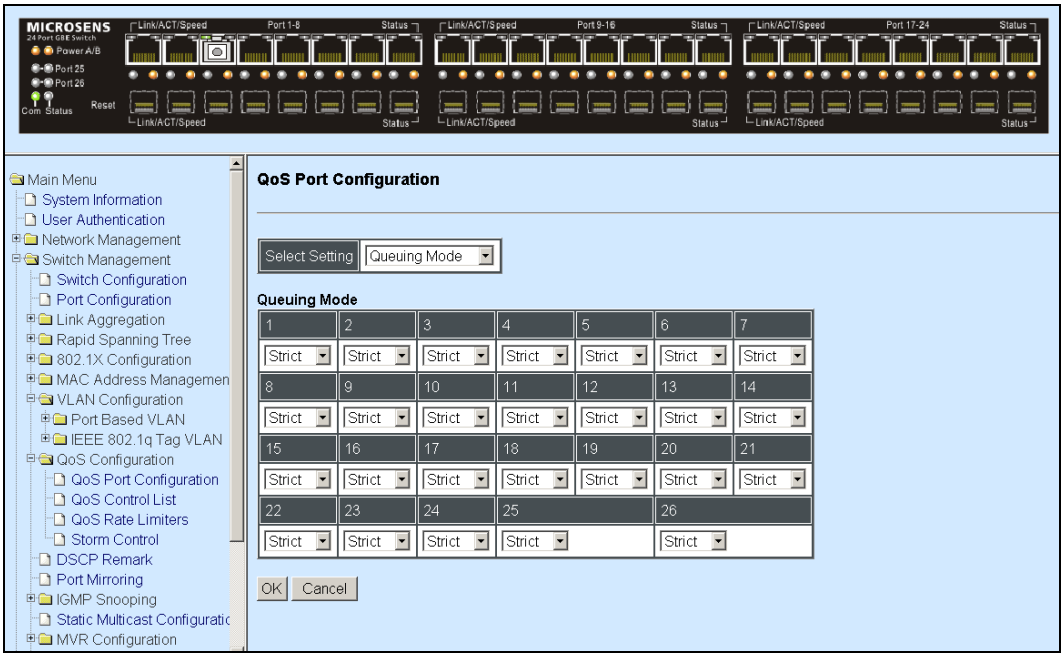


There are eight priority levels that you can choose to classify data packets. Choose one of the listed options from the pull-down menu for CoS (Class of Service) priority tag values. The default value is “0”.

The default 802.1p settings are shown in the following table:

Priority Level	normal	low	low	normal	medium	Medium	High	high
802.1p Value	0	1	2	3	4	5	6	7

Configure Queuing Mode:

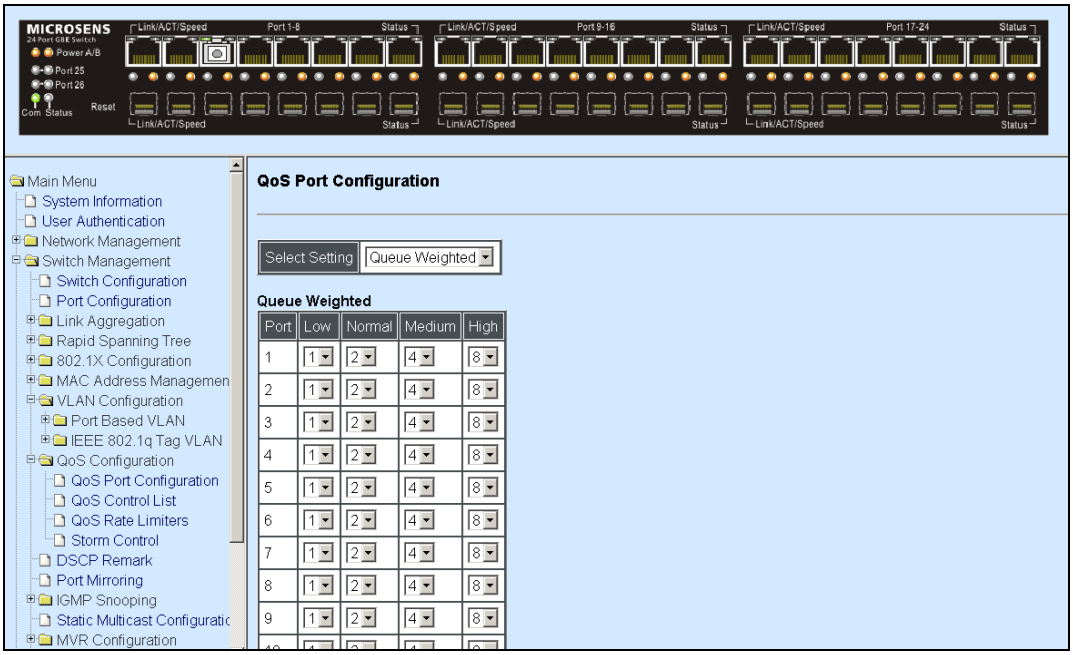


There are two different queuing modes:

Strict: This indicates that services to the egress queues are offered in the sequential order and all traffic with higher priority queues are transmitted first before lower priority queues are serviced.

Weight: Weighted Round-Robin shares bandwidth at the egress ports by using scheduling weights 1, 2, 4, 8 for queues 1 through 4 respectively.

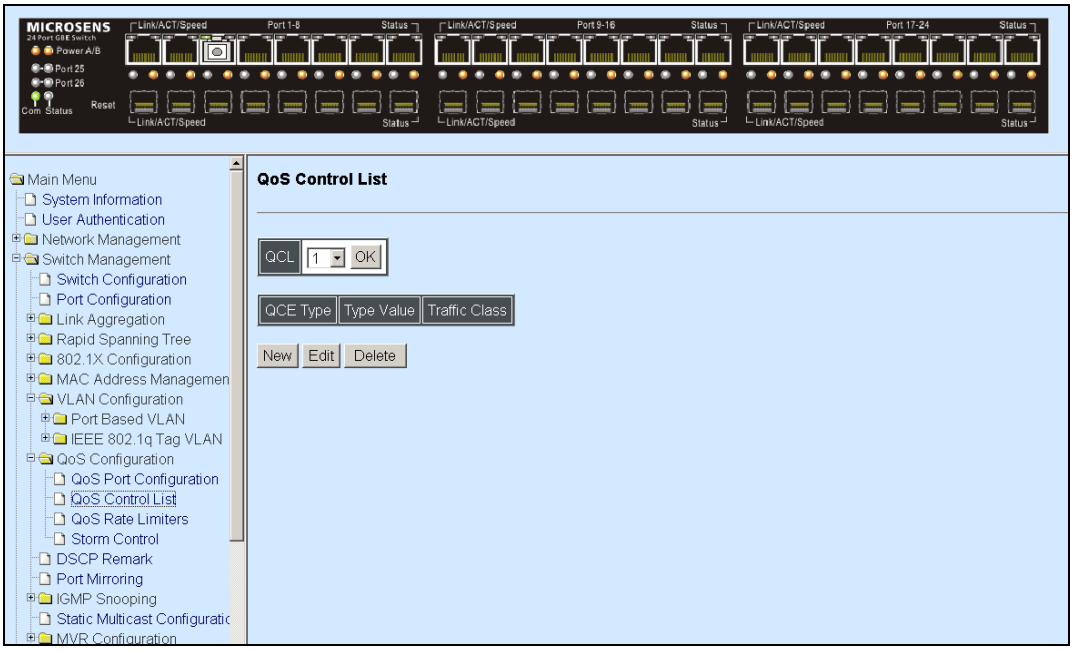
Configure Queuing Weighted:



Click the pull-down menu to select values of Queue weighted for each port.

4.4.8.2 QoS Control List

The following screen page appears if you choose **QoS Priority Configuration** and then select **QoS Control List**.



QCL: Select a QCL number (1~24).

QCE Type: View-only filed that shows QCL's current QCE type.

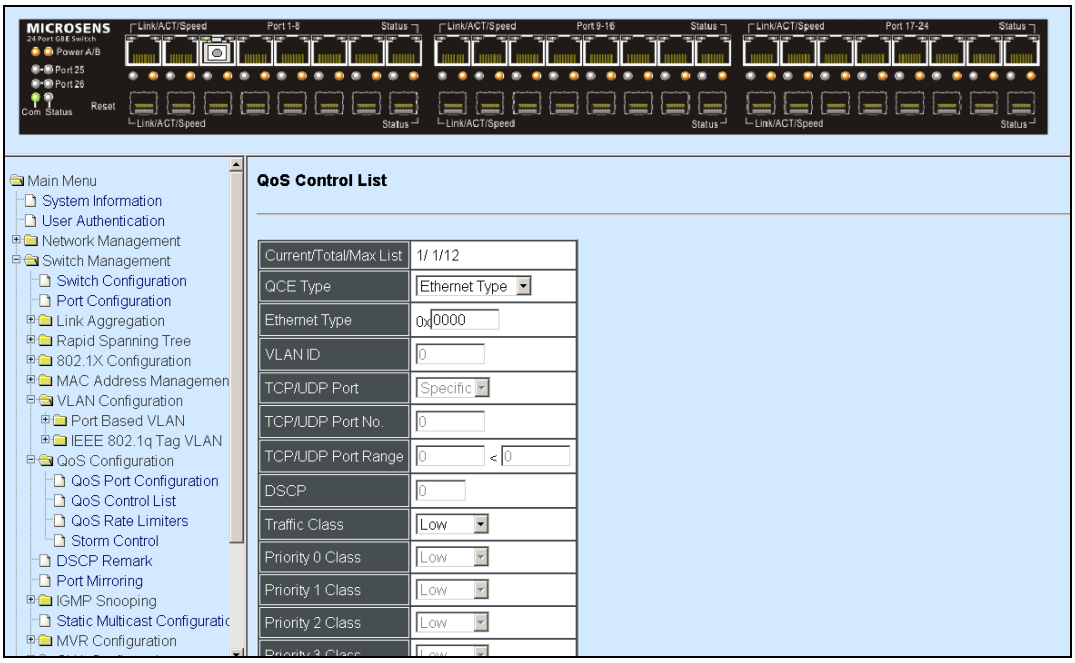
Type Value: View-only field that shows QCL's current type value.

Traffic Class: View-only field that shows QCL's Traffic Class.

Click **New** to add a new QCL setting and then the following screen page appears.

Click **Edit** to view and edit registered QCL settings.

Click **Delete** to remove a current QCL setting.



Current/Total/Max List: View-only field.

Current: This shows the number of current registered QCL setting(s).

Total: This shows the number of total registered QCL setting(s).

Max List: The shows the number of maximum QCL settings that are available for registration. The default number is 12.

QCE Type: Click the pull-down menu to select the desired privilege for the QCE type operation.

Ethernet Type: When you choose **Ethernet Type** as your preferred QCE Type, you can further specify your Ethernet Type in this field, such as 88A8, 9100, 9200, 9300.

VLAN ID: When you choose **VLAN ID** as your preferred QCE Type, you can further specify VLAND ID value from 1 to 4094.

TCP/UDP Port: When you choose **UDP/TCP Port** as your preferred QCE Type, you can further specify TCP/UDP Port by selecting “Specific” or “Range” from the pull-down menu. “Specific” allows you to assign “TCP/UDP Port No.”. On the other hand, “Range” allows you to assign TCP/UDP port range in “TCP/UDP Port Range” field.

DSCP: When you choose **DSCP** as your preferred QCE Type, you can further specify DSCP value.

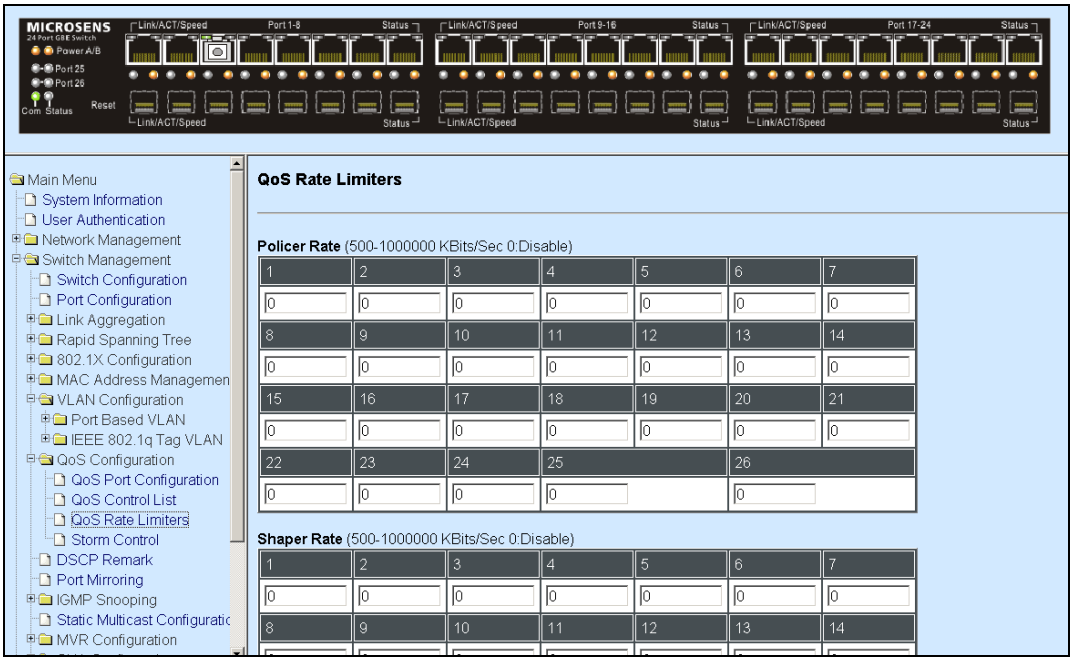
Traffic Class: When you choose **Ethernet Type**, **VLAN ID**, **UDP/TCP Port** or **DSCP** as your preferred QCE Type, you can further specify traffic class queues. Four types of Traffic Class you can choose from are “Low”, “Normal”, “Medium” and “High”.

Priority Class: When you choose **ToS** or **Tag Priority** as your preferred QCE Type, you can assign a priority level (Low, Normal, Medium or High) to the specific priority class.

4.4.8.3 QoS Rate Limiter

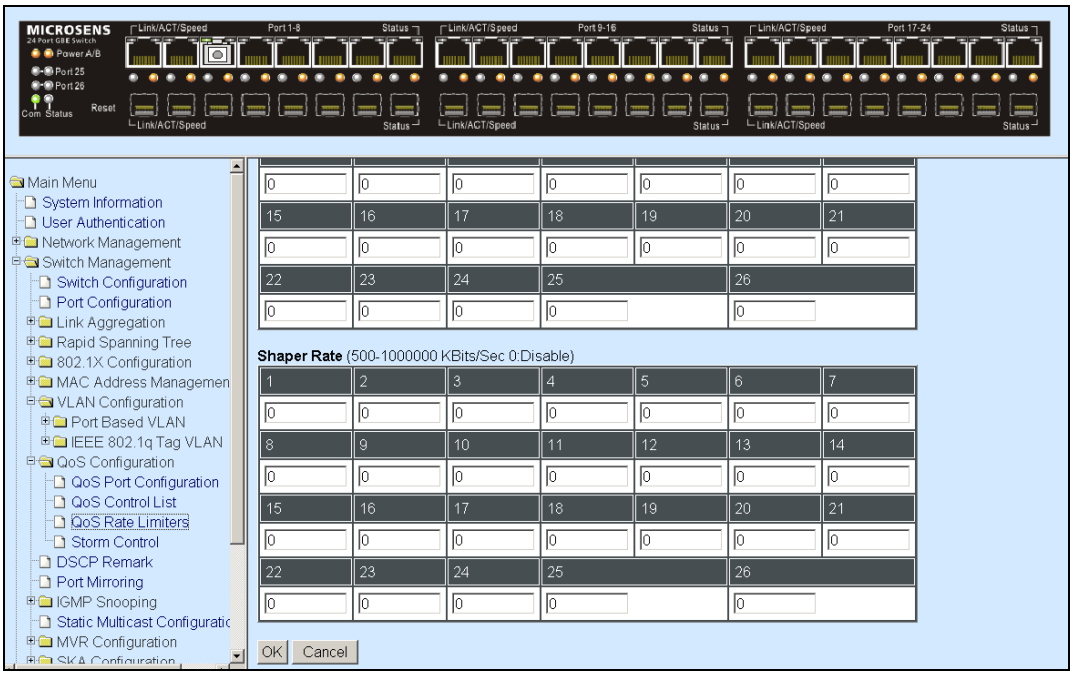
Select the option **QoS Rate Limiter** from the **QoS Priority Configuration** menu and then the following screen page appears.

Configure Policer Rate:



This allows users to specify each port's Policer bandwidth.

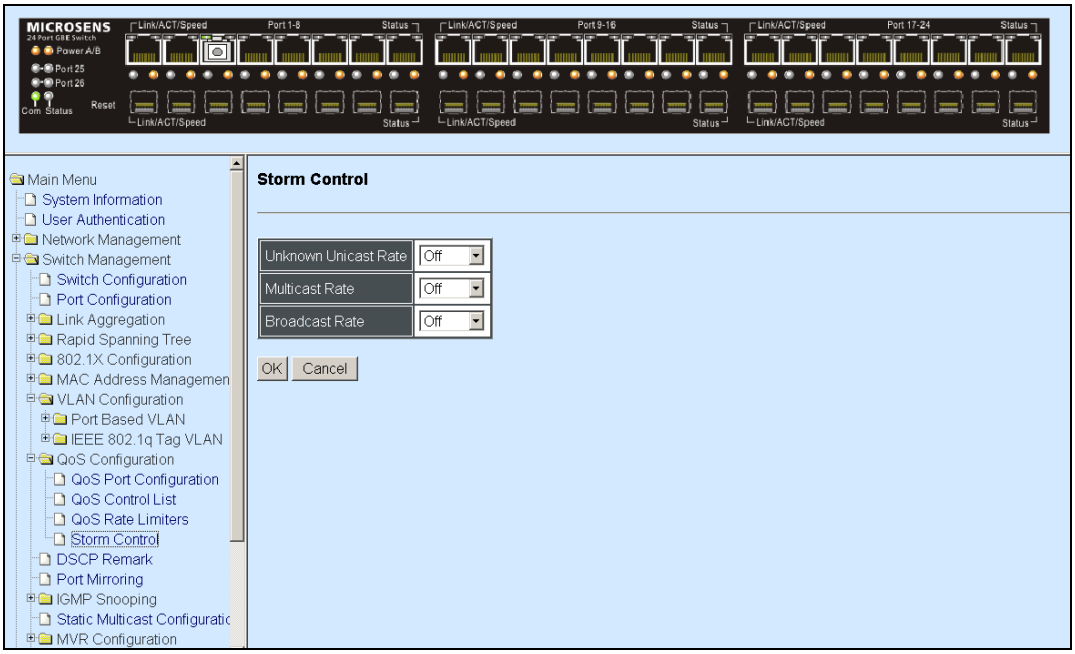
Configure Shaper Rate:



This allows users to specify each port's Shaper bandwidth.

4.4.8.4 Storm Control

Select the option **Storm Control** from the **QoS Priority Configuration** menu to set up the broadcast storm control parameters for ports and then the following screen page appears.



When a device on the network is malfunctioning or application programs are not well designed or properly configured, broadcast storms may occur that will degrade network performance and even cause a complete halt. The network can be protected from broadcast storms by setting a threshold for broadcast traffic for each port. Any broadcast packets exceeding the specified threshold will then be dropped.

Three options of frame traffic are provided to allow users to enable or disable the storm control.

Unknown Unicast Rate: Set storm control as the Unknown Unicast Rate.

Multicast Rate: Set storm control as the Multicast Rate.

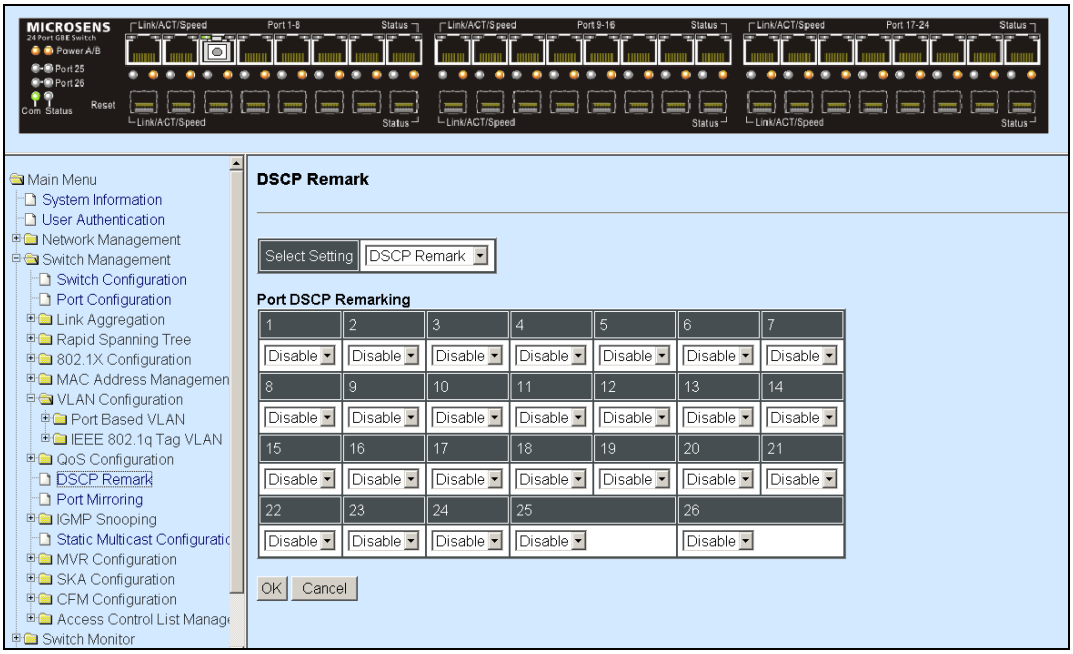
Broadcast Rate: Set storm control as the Broadcast Rate.

4.4.9 DSCP Remark

To set up DSCP Remark, select the option **DSCP Remark** from the **Switch Management** menu and then the following screen page appears.

Configure DSCP Remark:

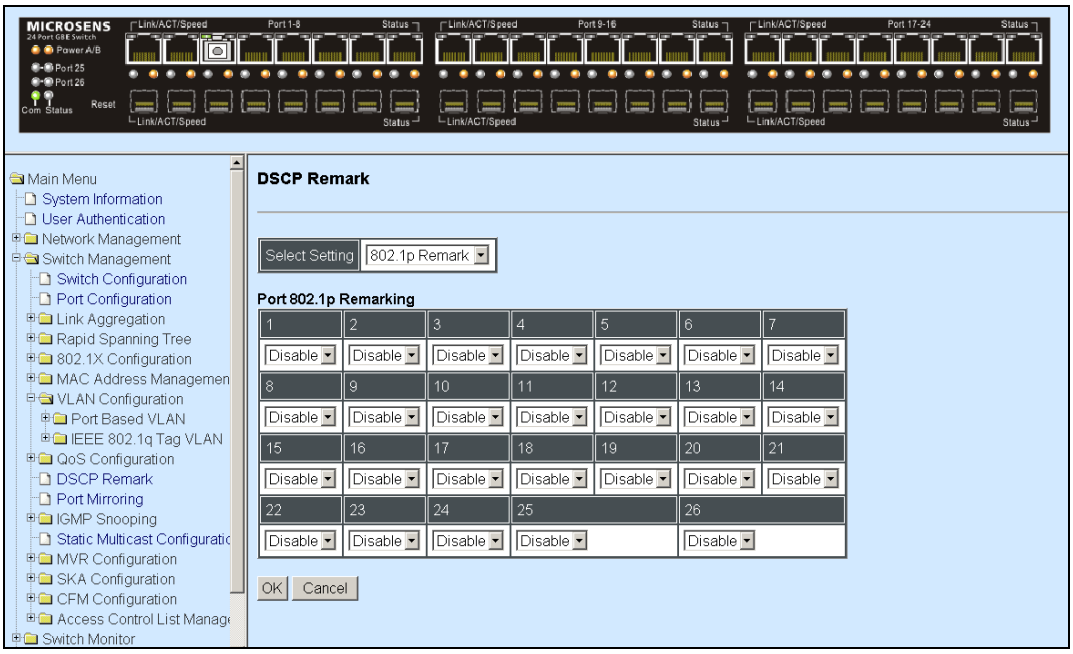
Select “DSCP Remark” from the pull-down menu of Select Setting.



This allows you to enable or disable DSCP remarking for each port. The default setting is disabled.

Configure 802.1p Remark:

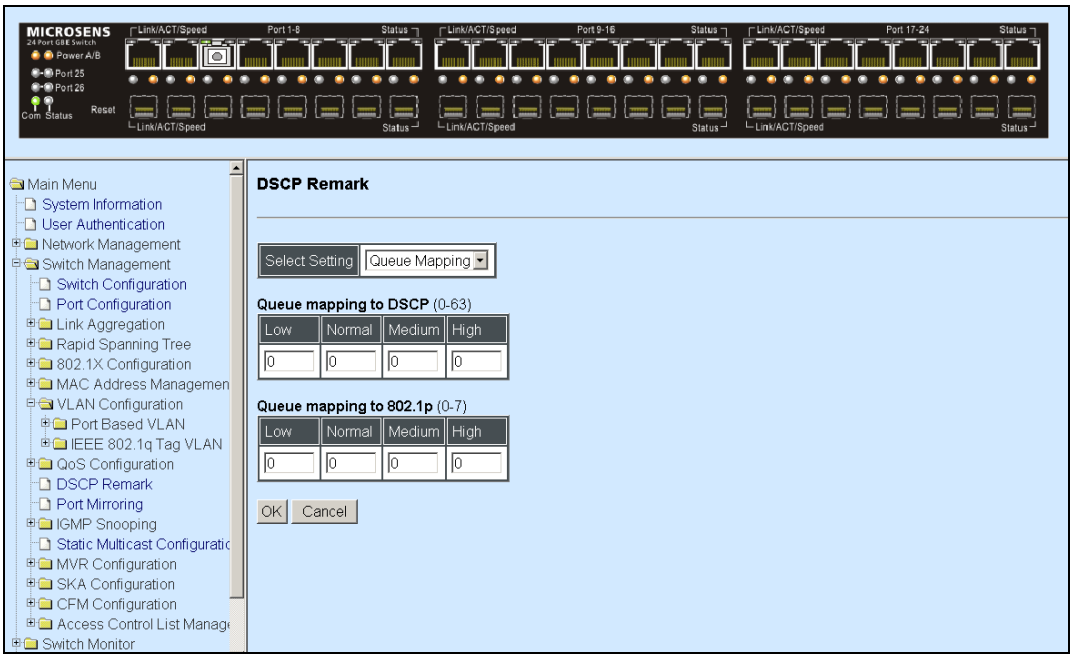
Select “802.1p Remark” from the pull-down menu of Select Setting.



This allows you to enable or disable 802.1p remarking for each port. The default setting is disabled.

Configure Queue Mapping:

Select “Queue Mapping” from the pull-down menu of Select Setting.

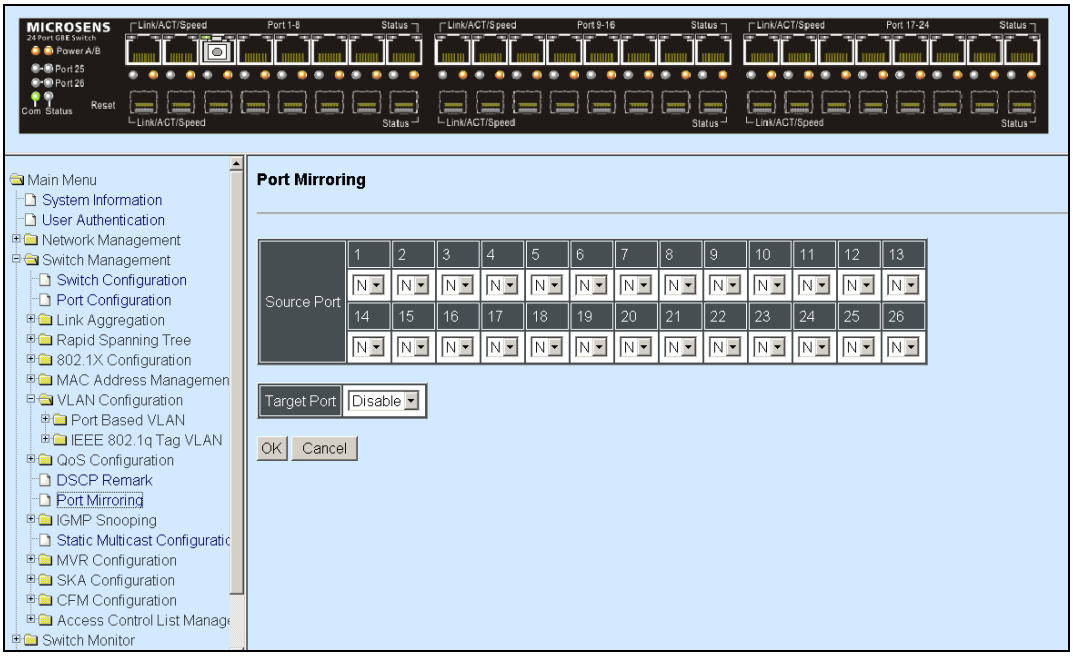


DSCP mapping to Queue: Assign a value (0~63) to four different levels.

802.1p mapping to Queue: Assign a value (0~7) to four different levels.

4.4.10 Port Mirroring

In order to allow Target Port to mirror Source Port and enable traffic monitoring, select the option **Port Mirroring** from the **Switch Management** menu and then the following screen page appears.



Source Port: Choose “Y” (enable) or “N” (disable) from the pull-down menu to enable or disable Target Port’s mirroring on the TX and RX of Source port.

Target Port: Select the preferred target port for mirroring.

4.4.11 IGMP Snooping

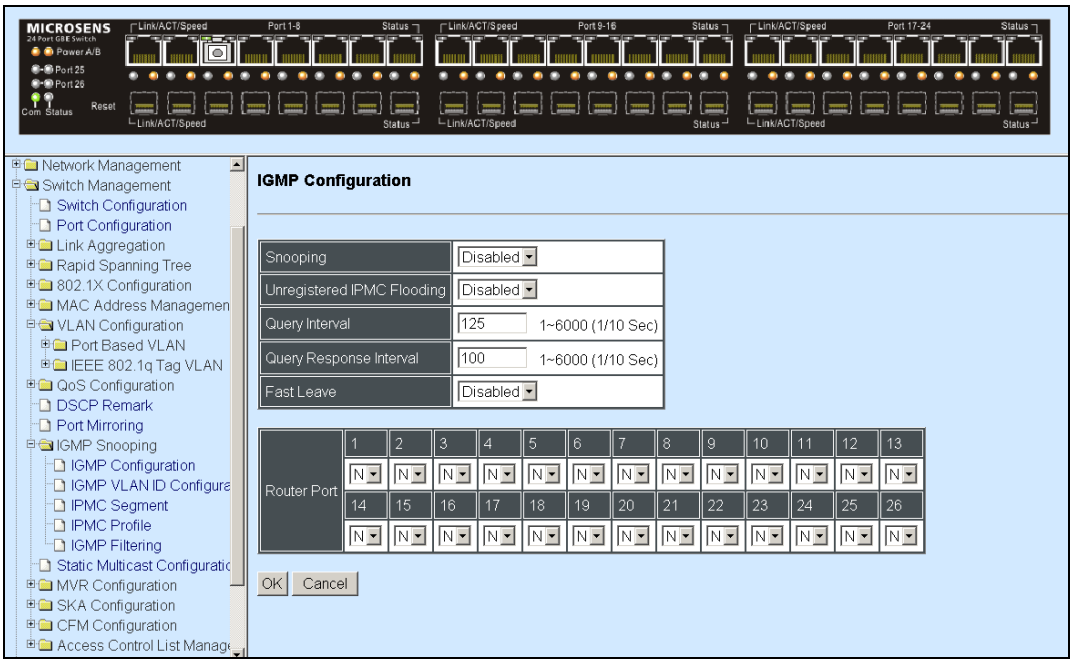
The Internet Group Management Protocol (IGMP) is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships. It can be used more efficiently when supporting activities, such as, online streaming video and gaming.

IGMP Snooping is the process of listening to IGMP traffic. IGMP snooping, as implied by the name, is a feature that allows the switch to “listen in” on the IGMP conversation between hosts and routers by processing the layer 3 packets that IGMP packets sent in a multicast network.

When IGMP snooping is enabled in a switch, it analyses all the IGMP packets between hosts connected to the switch and multicast routers in the network. When a switch receives an IGMP report for a given multicast group from a host, the switch adds the host's port number to the multicast list for that group. When the switch hears an IGMP Leave, it removes the host's port from the table entry.

IGMP snooping can reduce multicast traffic from streaming and other bandwidth intensive IP applications more effectively. A switch using IGMP snooping will only forward multicast traffic to the hosts in that traffic. This reduction of multicast traffic reduces the packet processing at the switch (at the cost of needing additional memory to handle the multicast tables) and also decreases the workload at the end hosts since their network cards (or operating system) will not receive and filter all the multicast traffic generated in the network.

Select the folder **IGMP Snooping** from the **Switch Management** menu and then the following screen page appears.



IGMP Configuration: To enable or disable IGMP, Unregistered IPMC Flooding and set up router ports.

IGMP VLANID Configuration: To set up the ability of IGMP snooping and querying with VLAN.

IGMP Settings: To set up the Query interval, response interval of IGMP snooping and enable or disable Fast leave.

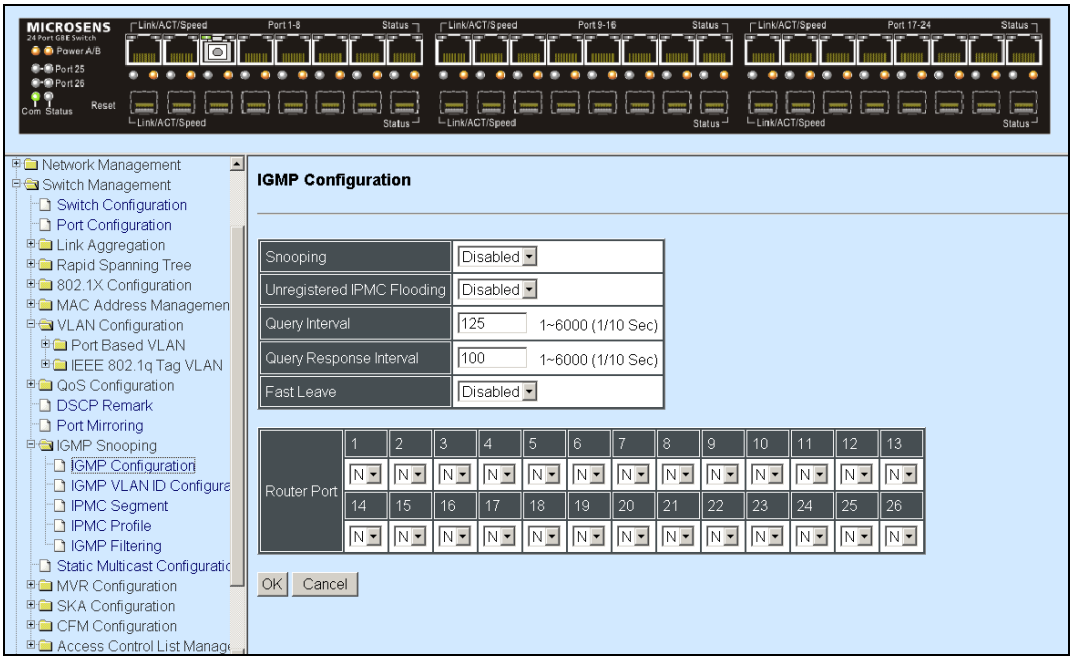
IPMC Segment: To create, edit or delete IPMC segment.

IPMC Profile: To create, edit or delete IPMC profile.

IGMP Filtering: To enable or disable IGMP filter and configure each port's IGMP filter.

4.4.11.1 IGMP Configuration

Select the option **IGMP Configuration** from the **IGMP Snooping** menu and then the following screen page appears.



Snooping: When enabled, the Managed Switch will monitor network traffic and determine which hosts will receive multicast traffic.

Unregistered IPMC Flooding: Set forwarding mode for unregistered (not-joined) IP multicast traffic. The traffic will flood when enabled. However, the traffic will forward to router-ports only when disabled.

Query Interval: The Query Interval is used to set the time between transmitting IGMP queries, entries between 1 ~ 6000 seconds are allowed. (Default value 125, One Unit =1 second)

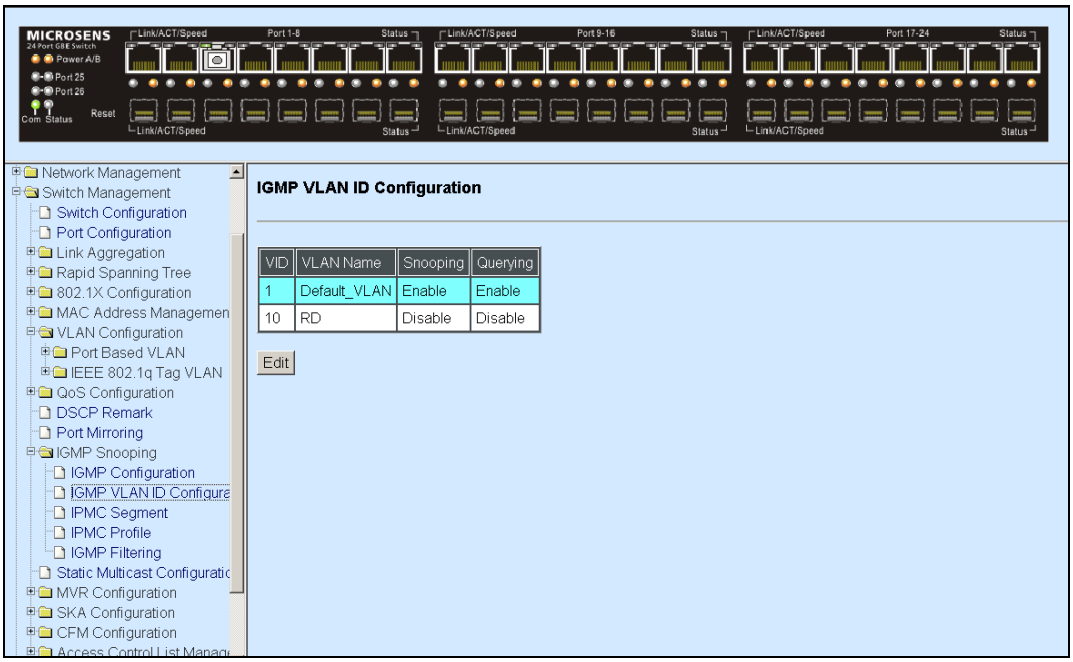
Query Response Interval: This determines the maximum amount of time allowed before sending an IGMP response report. (Default value 100, One Unit=0.1 second)

Fast Leave: The Fast Leave option may be enabled or disabled. This allows an interface to be ignored without sending group-specific queries. The default setting is “Disabled”.

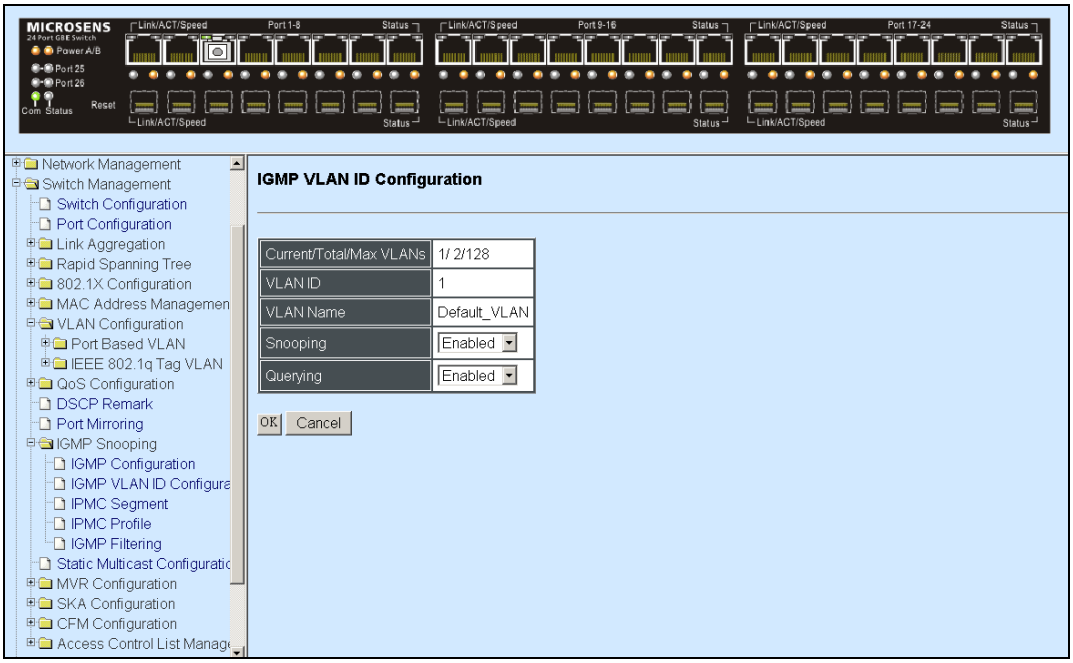
Router Ports: When ports are connected to the IGMP administrative routers, they should be set to “Y”. Otherwise, the default “N” will be applied.

4.4.11.2 IGMP VLANID Configuration

Select the option **IGMP VLAN Configuration** from the **IGMP Snooping** menu and then the following screen page with the ability information of IGMP Snooping and Querying in VLAN(s) appears.



Select the current VLAN(s) and click **Edit** to view and edit the ability settings.

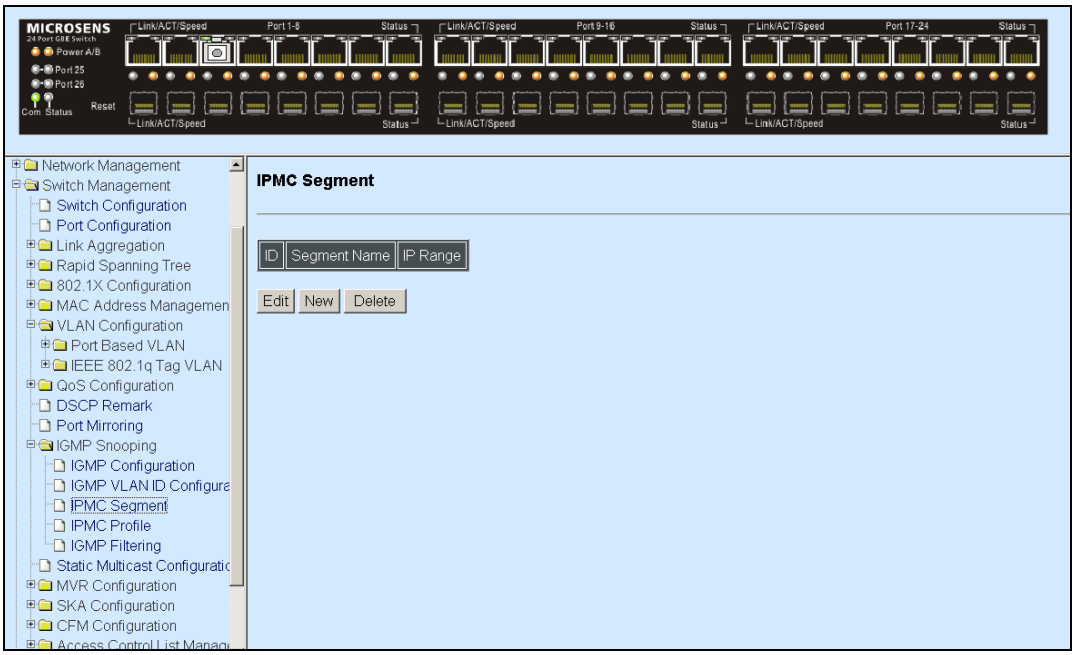


Snooping: When enabled, the port in VLAN will monitor network traffic and determine which hosts want to receive the multicast traffic.

Querying: When enabled, the port in VLAN can serve as the Querier which is responsible for asking hosts whether they want to receive multicast traffic.

4.4.11.3 IPMC Segment

Select the option **IPMC Segment** from the **IGMP Snooping** menu and then the following screen page with the ability information of IPMC Segment **ID**, **Name** and **IP Range** appears.



ID: View-only field that shows the current registered ID number.

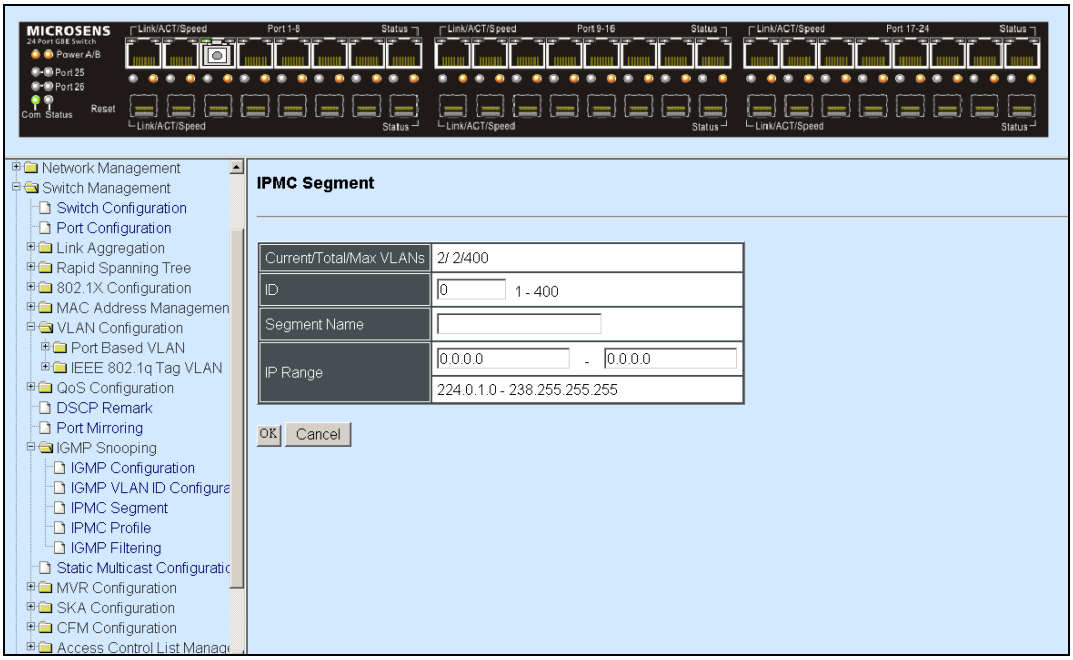
Segment Name: View-only field that shows the current registered Name.

IP Range: View-only field that shows the current registered IP Range.

Click **New** to register a new IPMC Segment and then the following screen page appears.

Click **Edit** to edit and view the IPMC Segment settings.

Click **Delete** to remove a current IPMC Segment registration.



Current/Total/Max Segment Nums: View-only field.

Current: This shows the number of current registered IPMC Segment.
Total: This shows the total number of registered IPMC Segment.
Max: This shows the maximum number available for IPMC Segment. The maximum number is 400.

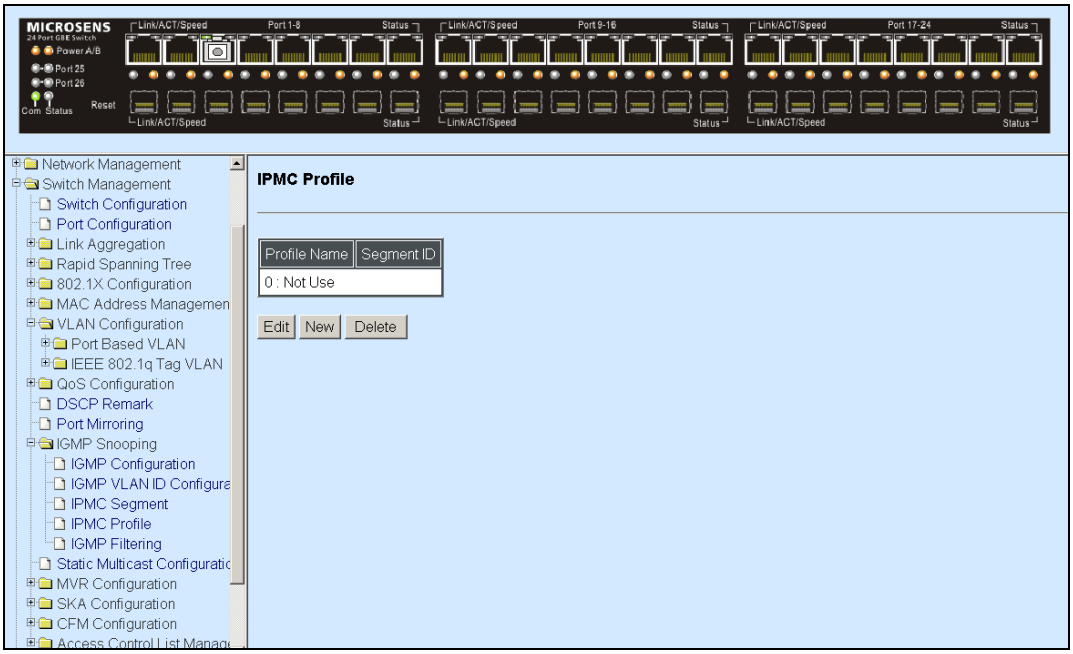
Segment ID: Specify a number from 1~400 for a new ID.

Segment Name: Enter an identification name. This field is limited to 20 characters.

IP Range: Specify the multicast streams IP range for the registered segment. (The IP range is from 224.0.1.0~238.255.255.255.)

4.4.11.4 IPMC Profile

Select the option **IPMC Profile** from the **IGMP Snooping** menu and then the following screen page with the ability information of IPMC Profile appears.



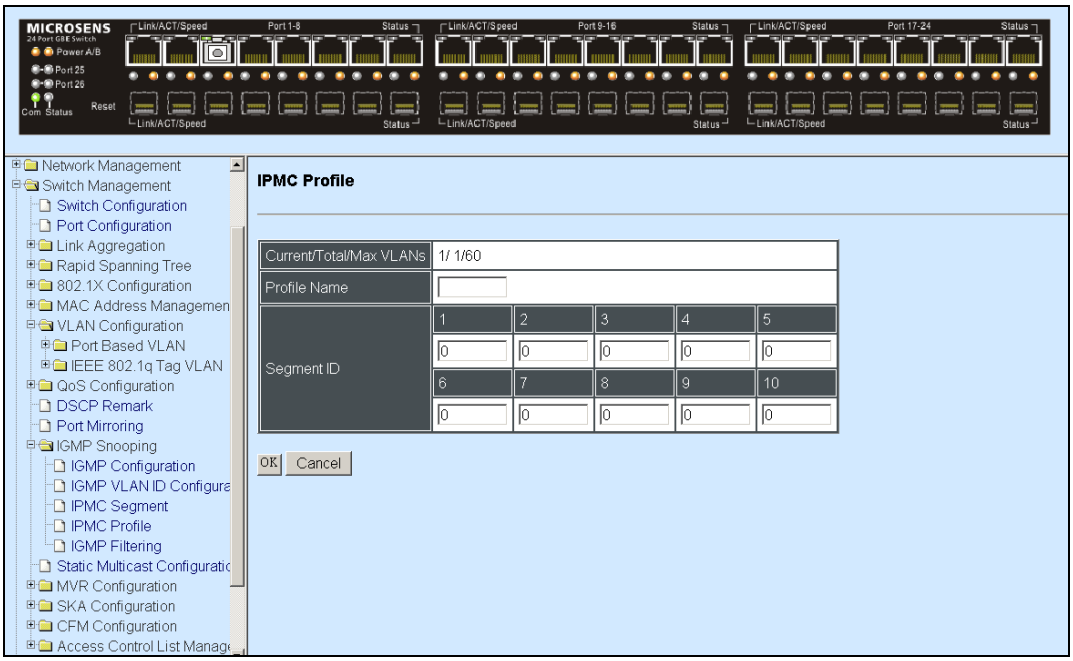
Profile Name: View-only field that shows the current registered profile name.

Segment ID: View-only field that shows the current registered segment ID.

Click **New** to register a new IPMC Profile and then the following screen page appears.

Click **Edit** to edit the IPMC Profile settings.

Click **Delete** to remove a current IPMC Profile registration.



Current/Total/Max Profile Nums: View-only field.

Current: This shows the number of current registered IPMC Profile.

Total: This shows the number of total IPMC Profiles that are registered.

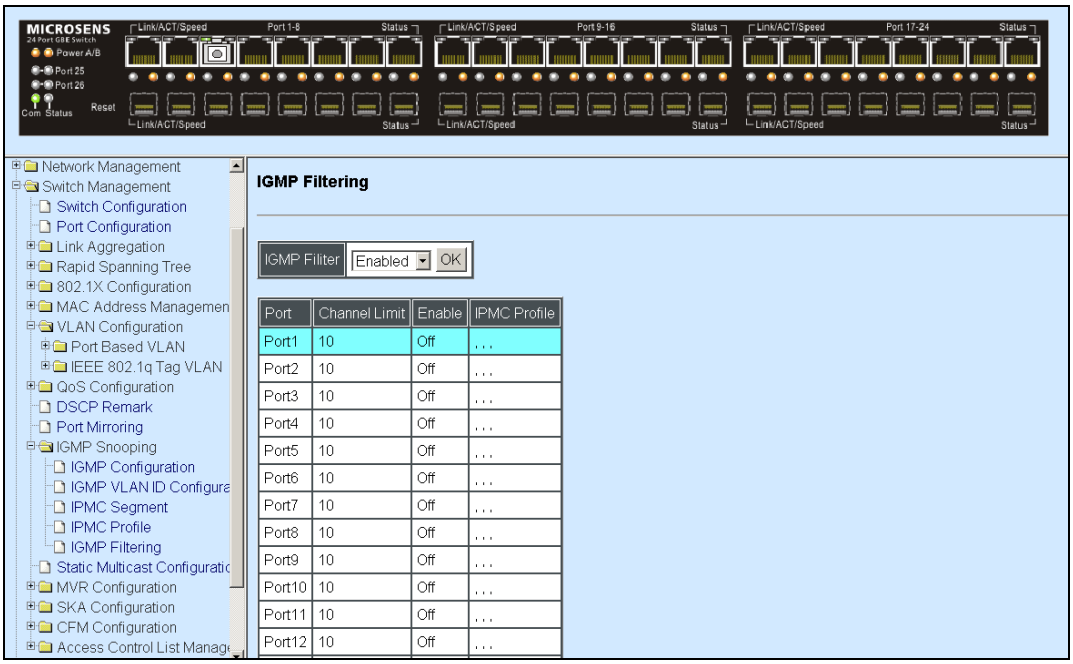
Max: This shows the maximum number available for IPMC Profile. The maximum number is 60.

Profile Name: Enter an identification name. This field is limited to 20 characters.

Segment ID: Specify the segment ID that is registered in **IPMC Segment**.

4.4.11.5 IGMP Filtering

Select the option **IGMP Filtering** from the **IGMP Snooping** menu and then the following screen page appears.

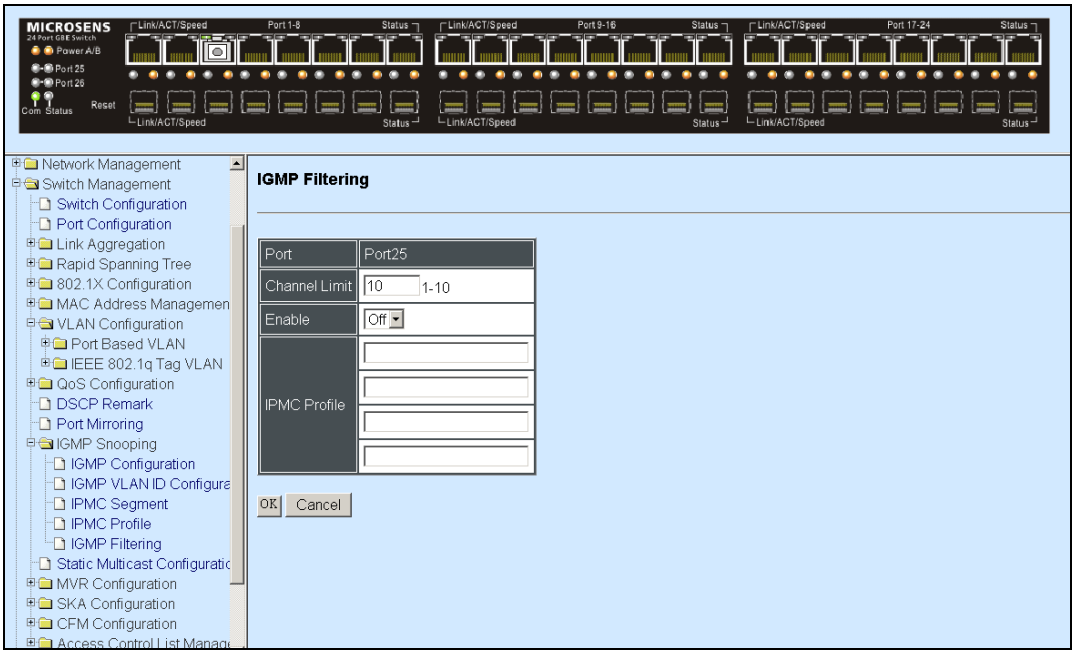


IGMP Filter: This option may enable or disable the IGMP filter. The default setting is “Disabled”.

Channel Limit: View-only field that shows the maximum limit of each port’s multicast streams.

Enable: View-only field that shows each port’s IGMP filter is turned on or off.

Move the cursor to the port that you would like to edit (click then the entry will be highlighted in blue) and click **Edit** to view and edit the ability setting. The editing table is shown below.



Channel Limit: Specify the maximum transport multicast stream.

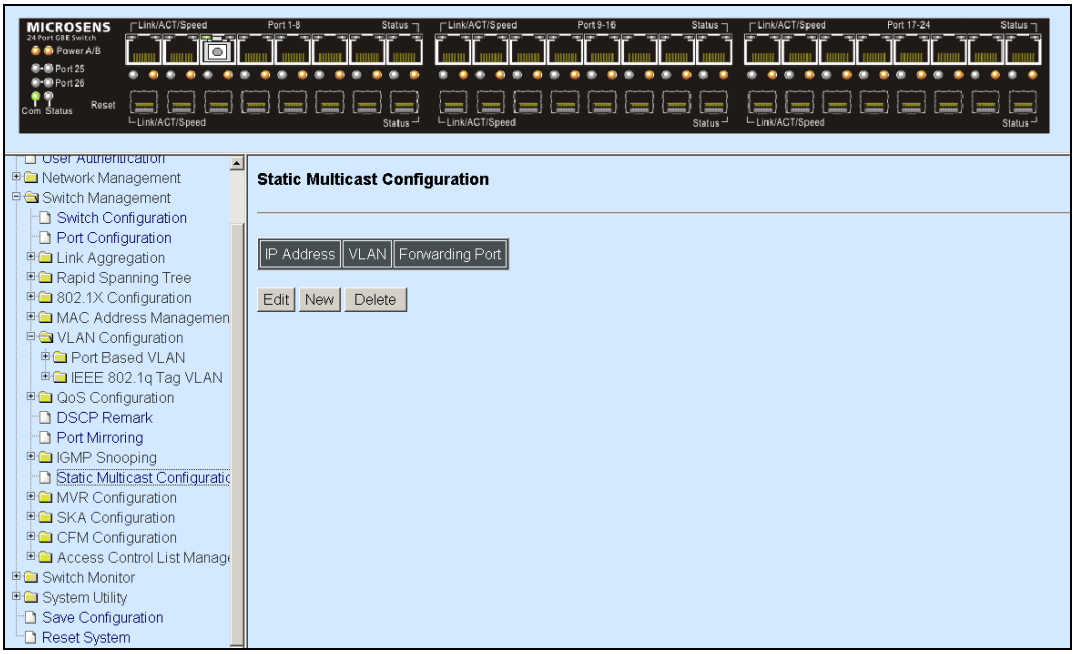
Enable: To enable each port's IGMP filtering function. The default setting is "Off" which is disabled.

Port: View-only field that shows the port number that is currently configured.

IPMC Profile: In IGMP filtering, it only allows information specified in IPMC Profile fields to pass-through. (The field for IPMC Profile name is from the entry registered in **IPMC Profile** option.)

4.4.12 Static Multicast Configuration

Select the option **Static Multicast Configuration** from the **Switch Management** menu and then the following screen page appears.



IP Address: View-only field that shows the current source IP address of multicast stream.

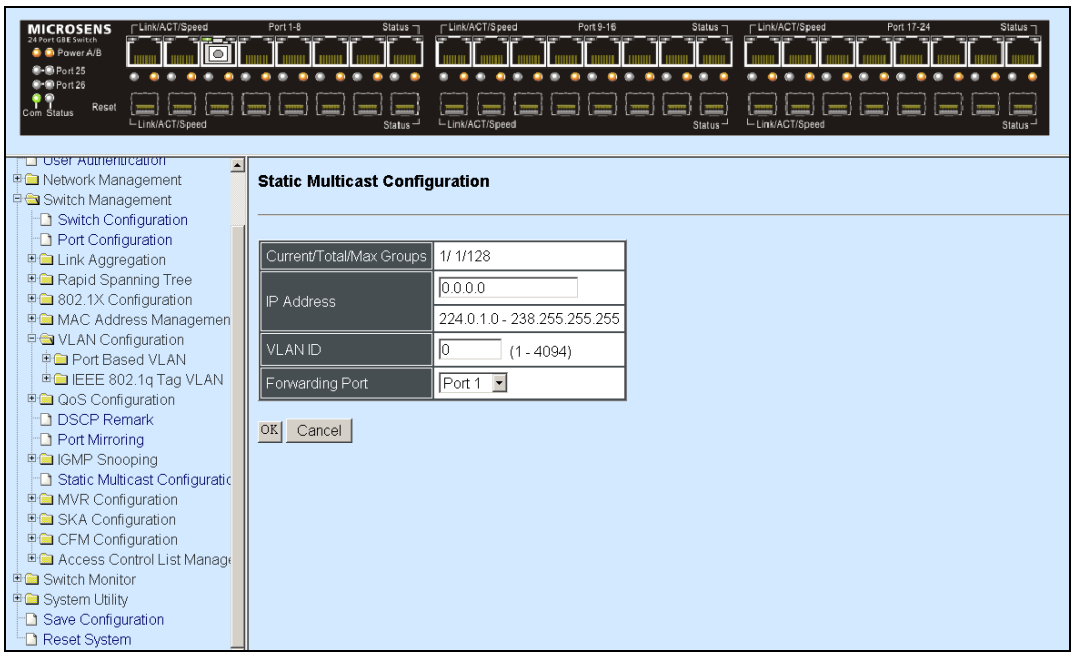
VLAN: View-only field that shows the specified VLAN ID for current multicast stream.

Forwarding port: View-only field that shows the forwarding port for current multicast stream.

Click **New** to register a new Static Multicast configuration and then the following screen page appears.

Click **Edit** to edit and view static multicast configuration settings.

Use **Delete** to remove a current Static Multicast configuration.



Current/Total/Max Multicast Nums: View-only field.

Current: This shows the number of current registered static multicast configuration.
Total: This shows the total number of registered static multicast configuration.
Max: This shows the maximum number available for static multicast configuration. The default maximum number is 128.

IP Address: Specify the multicast stream source IP address. The range can be entered is between 224.0.1.0 and 238.255.255.255.

VLAN: Specify a VLAN ID for multicast stream.

Forwarding port: Select a port number for multicast stream forwarding.

4.4.13 MVR

MVR refers to Multicast VLAN Registration that enables a media server to transmit multicast stream in a single multicast VLAN when clients receiving multicast VLAN stream can reside in different VLANs. Clients in different VLANs intend to join or leave the multicast group simply by sending the IGMP Join or Leave message to a receiver port. The receiver port that belongs to one of the multicast groups can receive multicast stream from the media server.

MVR Configuration Guidelines and Limitations

Guidelines:

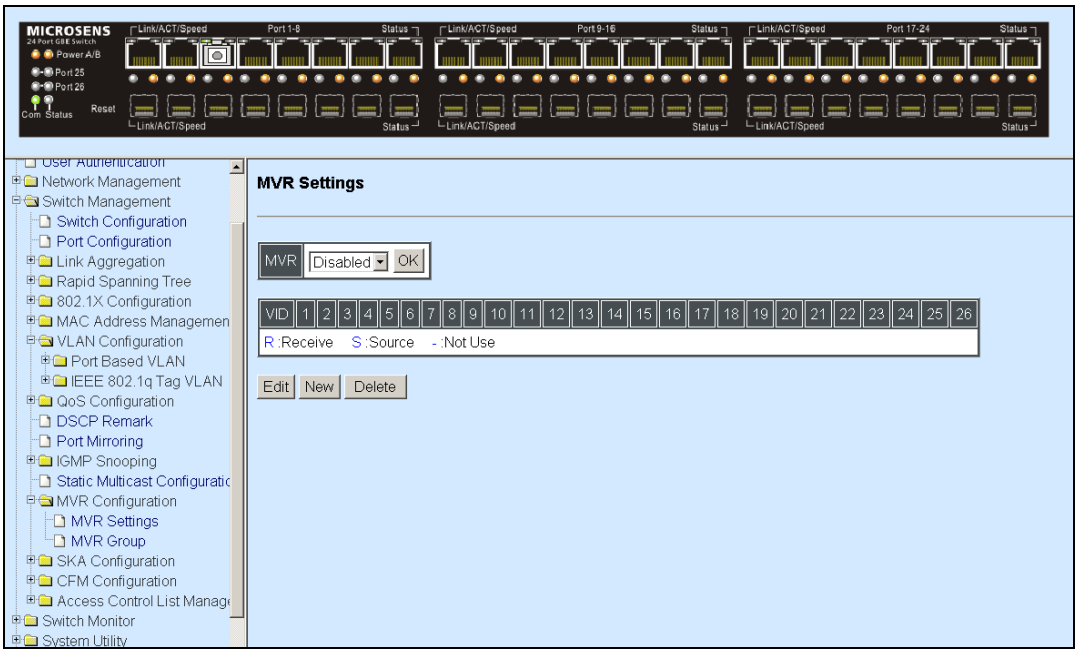
- Enable IGMP global setting.
- Enable MVR global setting.
- Create MVR VLAN and indicate the Source port and Receive port.
- Create MVR Groups whose multicasting channels would belong to MVR VLAN.
- Enable VLAN Aware in MVR Source Port. In a normal condition, Tag multicasting stream injects to Source port. (Optional)
- Setting VLAN Port Egress mode in MVR Receive port. In a normal condition, Un-tag multicasting stream forward to receive port. (Optional)

Limitation

- Receiver ports on a switch can be in different VLANs, but they should not belong to the multicast VLAN.
- Do not configure MVR on private VLAN ports.
- MVR can coexist with IGMP snooping on a switch.
- MVR data received on an MVR receiver port is not forwarded to MVR source ports.

- MVR does not support IGMPv3 messages.
- MVR on IPv6 multicast groups is not supported.

Click the folder **MVR Configuration** from the **Switch Management** menu and then the following screen page appears.

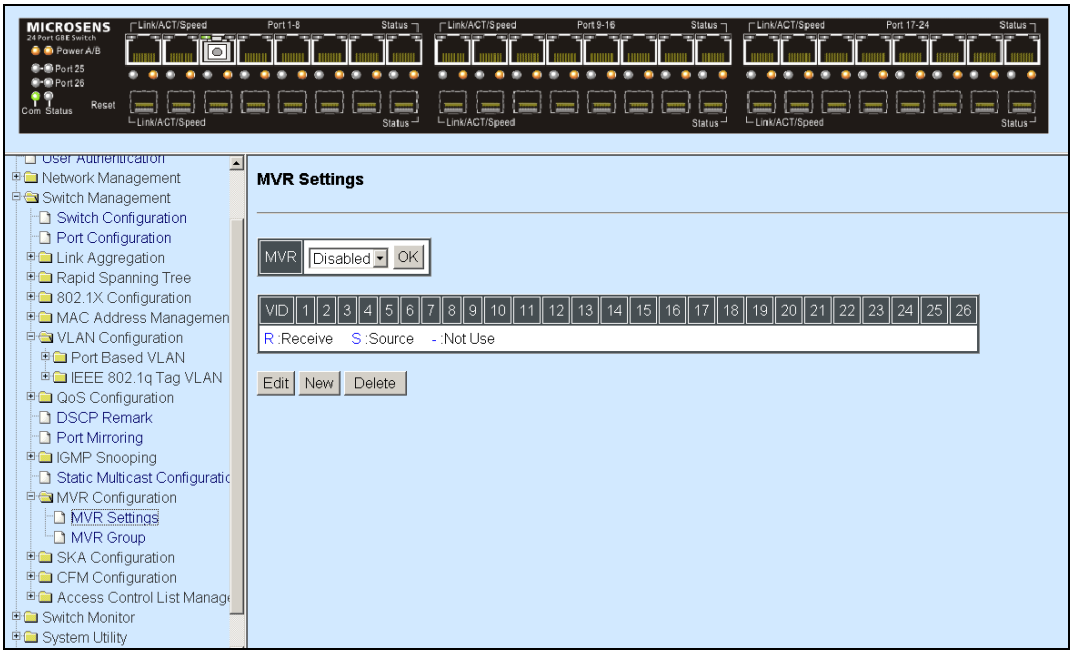


MVR Port Settings: To enable or disable MRV global settings and create MVR VLAN to indicate the Source and Receive port.

MVR Group: Create MVR Groups whose multicasting stream would belong to MVR VLAN.

4.4.13.1 MVR Settings

Select the option **MVR Settings** from the **MVR Configuration** menu and then the following screen page appears.



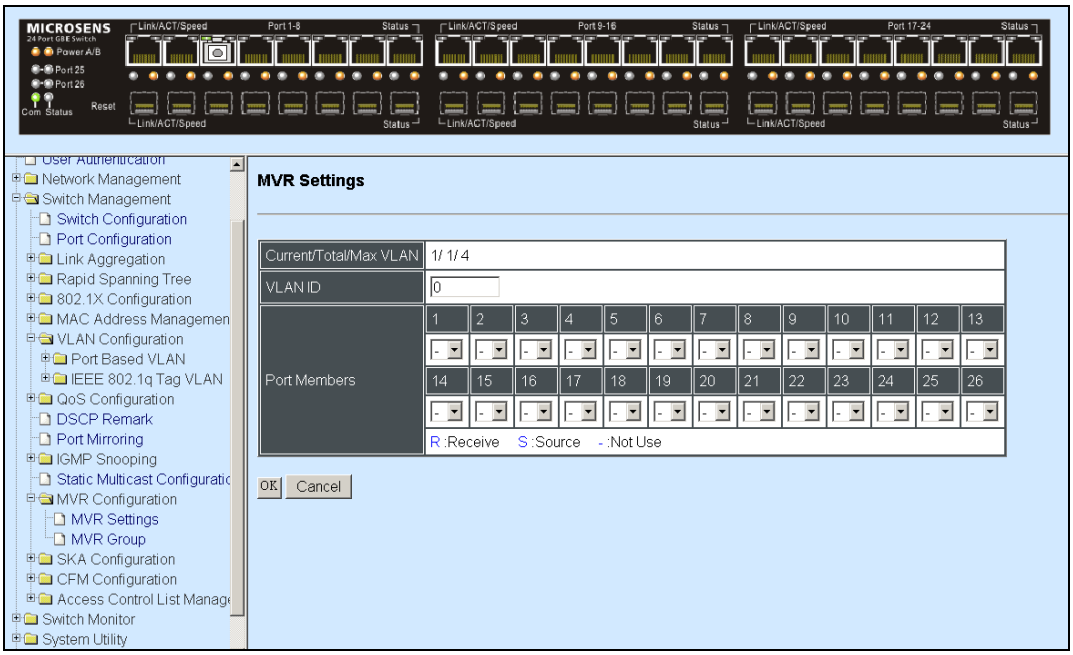
MVR: To enable or disable MVR global settings.

VID: View-only field that shows the specified MVR VLAN ID for current configuration.

Click **New** to register a new MVR VLAN ID and then the following screen page appears.

Click **Edit** to edit MVR settings.

Use **Delete** to remove a current MVR VLAN ID.



Current/Total/Max Multicast Nums: View-only field.

Current: This shows the number of current registered MVR VLAN configuration.
Total: This shows the total number of registered MVR VLAN configuration.

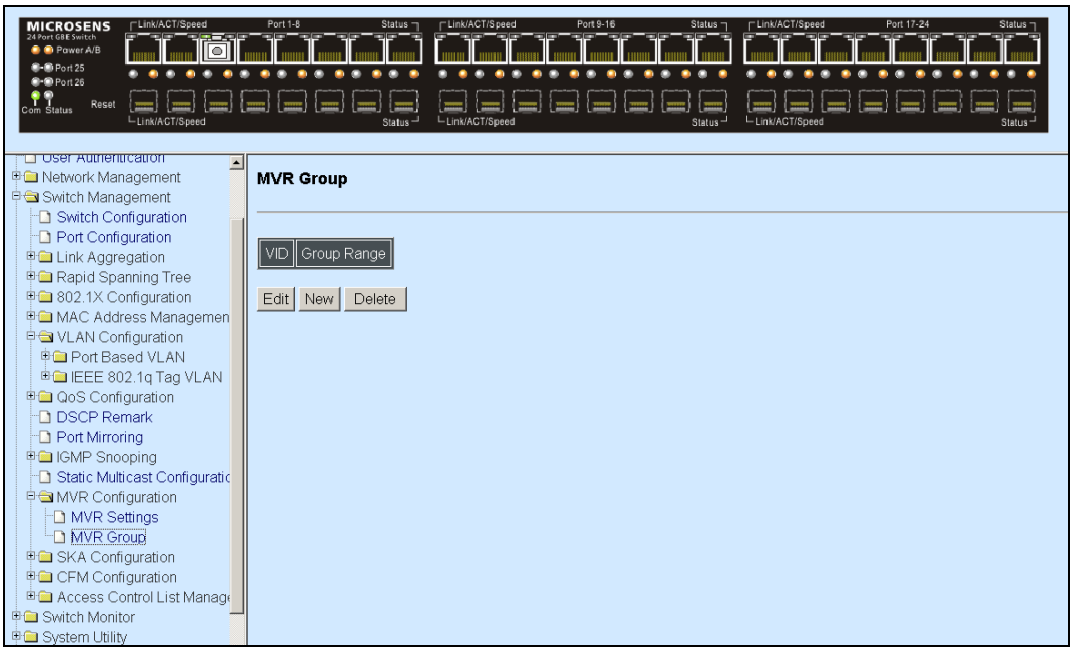
Max: This shows the maximum number available for MVR VLAN configuration.

VLAN ID: Specify a VLAN ID for multicast VLAN.

Port Members: Indicate whether each port is a receive port, source port, or not used.

4.4.13.2 MVR Group

Select the option **MVR Group** from the **MVR Configuration** menu and then the following screen page appears.



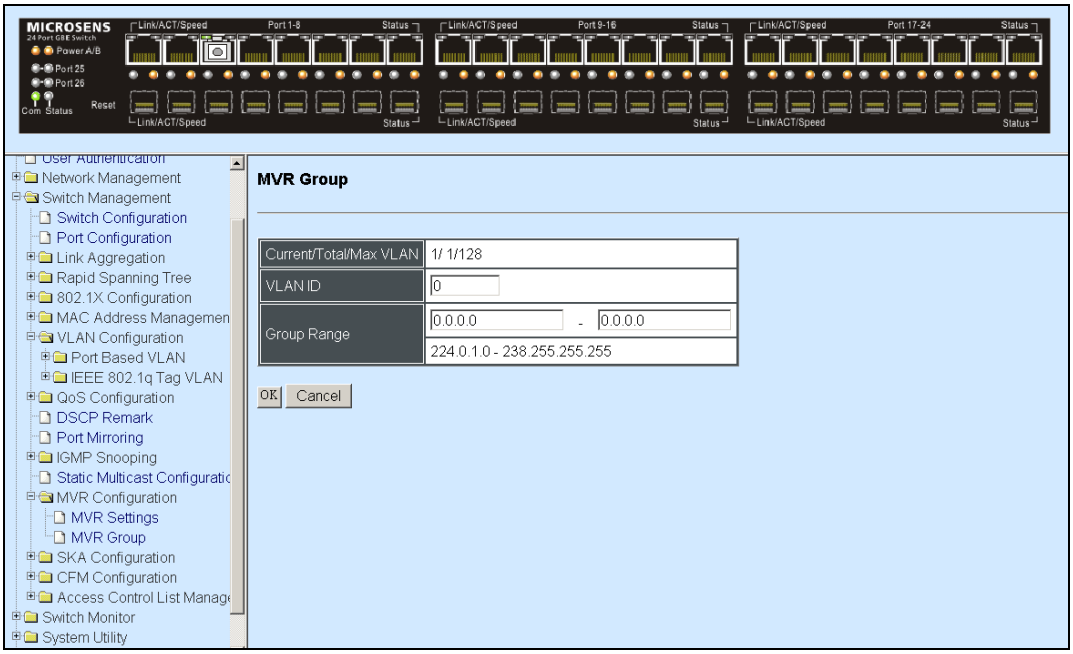
VLAN: View-only field that shows the current MVR VLAN ID.

Group Range: View-only field that shows the MVR Group Range.

Click **New** to register a new MVR Group and then the following screen page appears.

Click **Edit** to edit and view the MVR Group settings.

Click **Delete** to remove a current MVR Group.



Current/Total/Max Group Nums: View-only field.

Current: This shows the number of current registered MVR Group.
Total: This shows the total number of registered MVR Groups.
Max: This shows the maximum number available for registering MVR Group.

VLAN ID: Specify a VLAN ID number that is registered in MVR port settings.

Group Range: Specify the multicasting channels that would belong to MVR VLAN.

4.4.14 SKA Configuration

SKA refers to Secure Customer Connections. In this menu, it provides DHCP snooping, DHCP option 82, DHCP layer 2 relay and customer port (Port number 1~22) filtering functions.

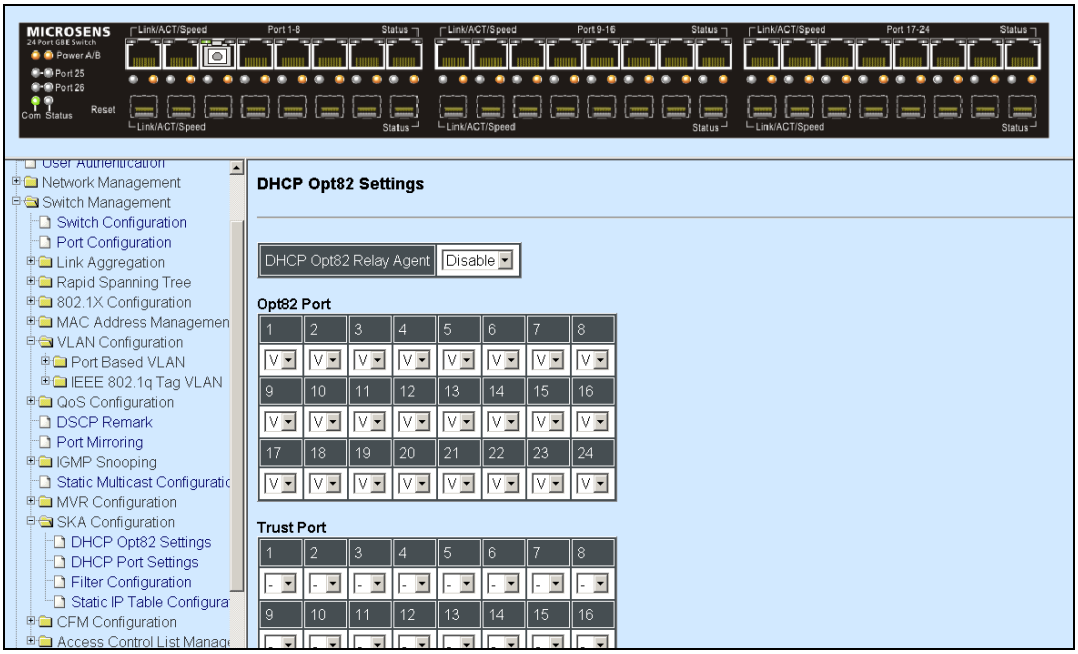
DHCP Option 82 Guidelines

The Managed Switch can add information about the source of client DHCP requests that relay to DHCP server by adding Relay Agent Information. This helps provide authentication about the source of the requests. The DHCP server can then provide an IP address based on this information. The feature of DHCP Relay Agent Information adds Agent Information field to the Option 82 field that is in the DHCP headers of client DHCP request frames.

Guidelines:

- Enable DHCP Option 82 Relay Agent global setting.
- Create Option 82 and trust port setting.
- Create Static IP table for authorized IP address.
- Each port's (Port Number 1~22) configuration for DHCP, Static IP or Unlimited.

Select the folder **SKA Configuration** from the **Switch Management** menu and then the following screen page appears.



DHCP Option 82 Settings: To enable or disable DHCP Option 82 relay agent global setting and show each port's configuration.

DHCP Port Settings: Customer port (Port 1~22) DHCP snooping setting.

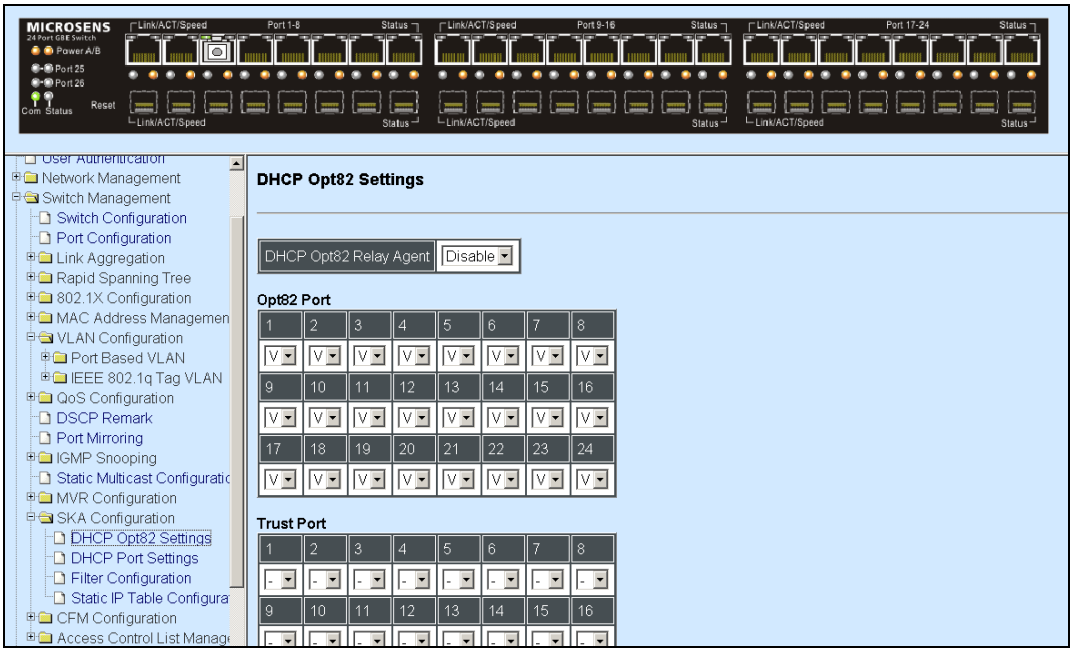
Filter Configuration: Customer port (Port 1~22) filtering setting.

Static IP Table Configuration: To create static IP table for DHCP snooping setting.

4.4.14.1 DHCP Option 82 Settings

Select the option **DHCP Option 82 Settings** from the **SKA Configuration** menu and then the following screen page appears.

Opt82 Port Setting:



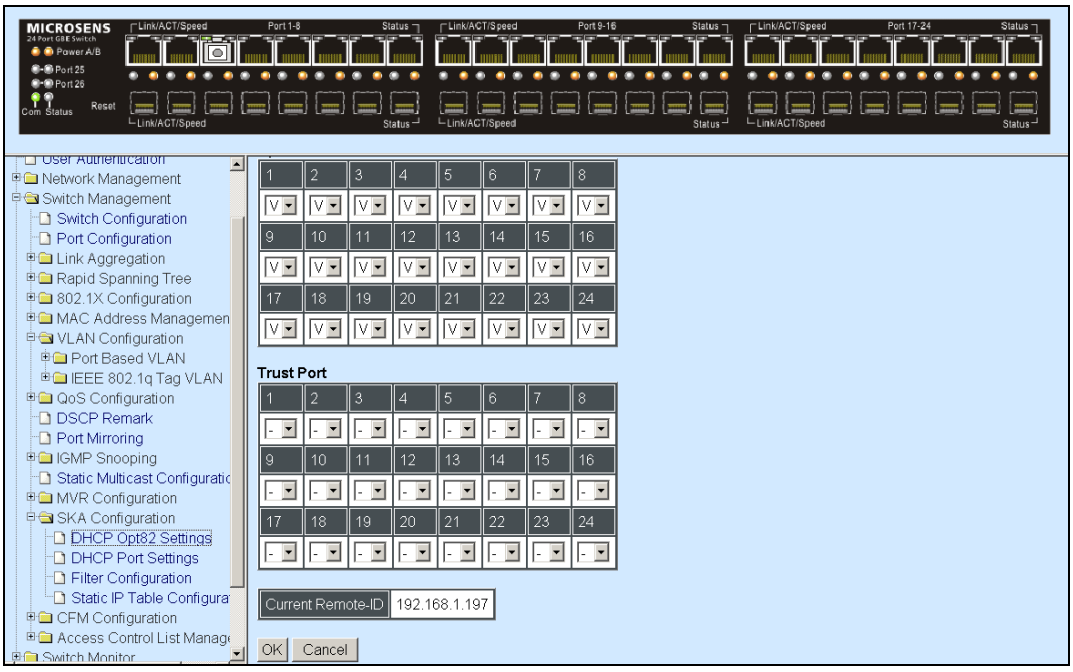
DHCP Opt82 Relay Agent: To enable or disable DHCP Opt82 Relay Agent Global setting.

Opt 82 Port: Each port's Agent information. When the symbol "V" is displayed, the port is enabled. Otherwise, it is disabled.

Enable (V): Add Agent information.

Disable: Forward.

Trust Port Setting:



When Trust Port is set to "V" (enabled),

a. it will receive packets with Agent information and the Managed Switch will forward them.

b. it will receive packets without Agent information and the Managed Switch will add Agent information.

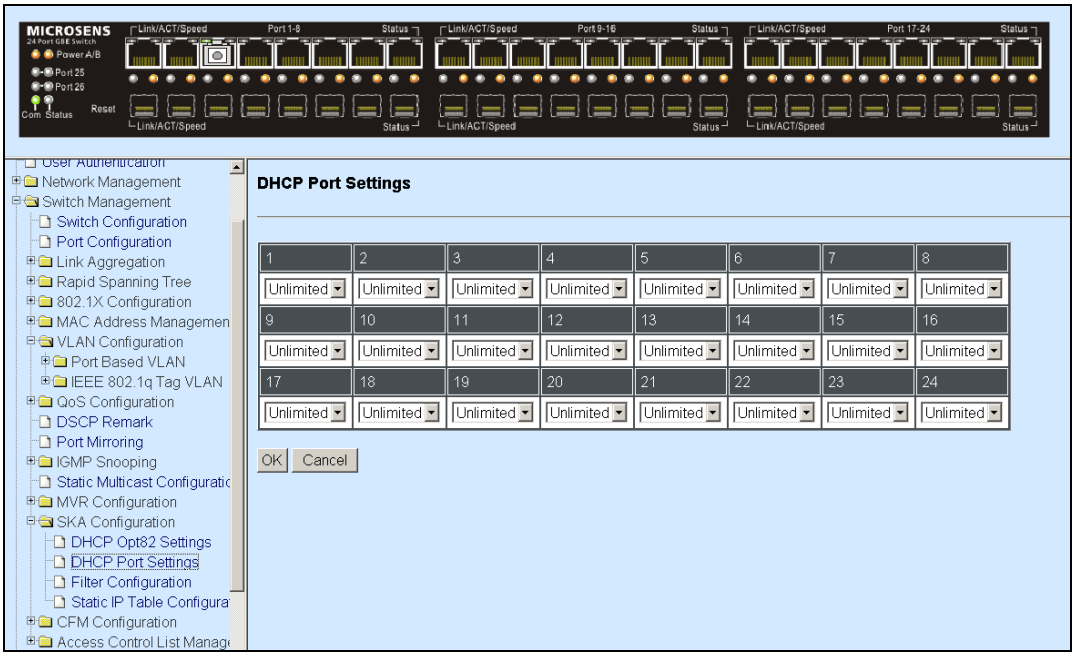
When Trust port is set to disabled,

a. it receives packets with Agent information and the Managed Switch will drop them.

b. it receives packets without Agent information and the Managed Switch will add Agent information.

4.4.14.2 DHCP Port settings

Select the option **DHCP Port Settings** from the **SKA Configuration** menu and then the following screen page appears.



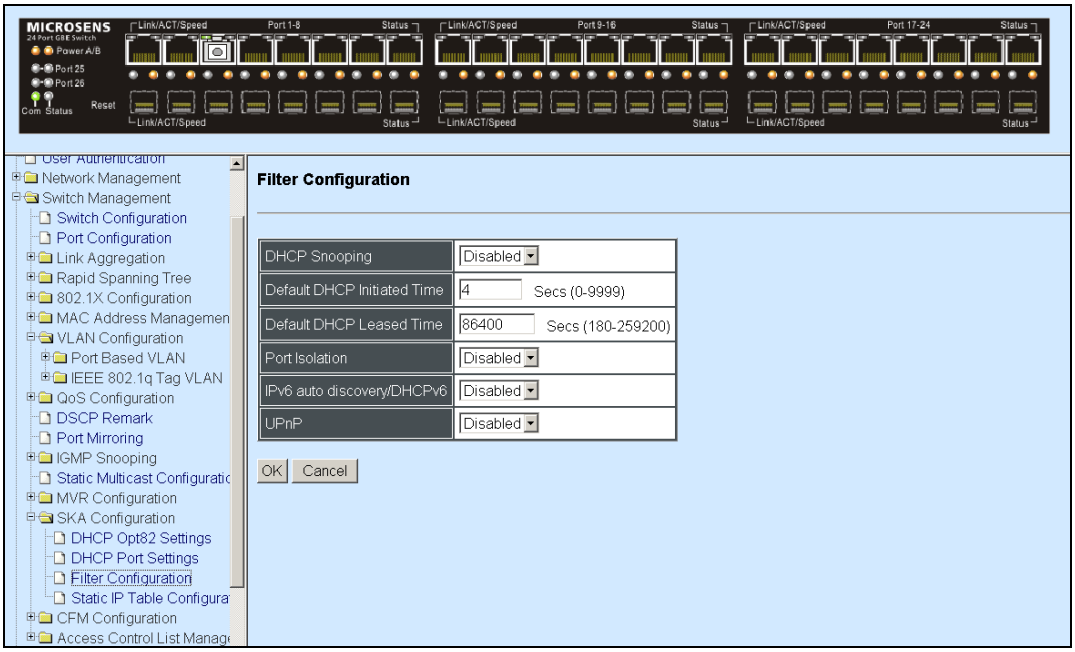
Unlimited: Non-Limited. (Static IP or DHCP assigns IP)

Fixed IP: Only Static IP. (The Static IP table must be created first.)

DHCP: DHCP server assigns IP address.

4.4.14.3 Filter Configuration

Select the option **Filter Configuration** from the **SKA Configuration** menu and then the following screen page appears.



DHCP Snooping: Enable or disable DHCP Snooping function.

Default DHCP Initiated Time: Specify DHCP initiated time. (4~9999 seconds)

Default DHCP Leased Time: Specify DHCP Leased time. (4~9999 seconds)

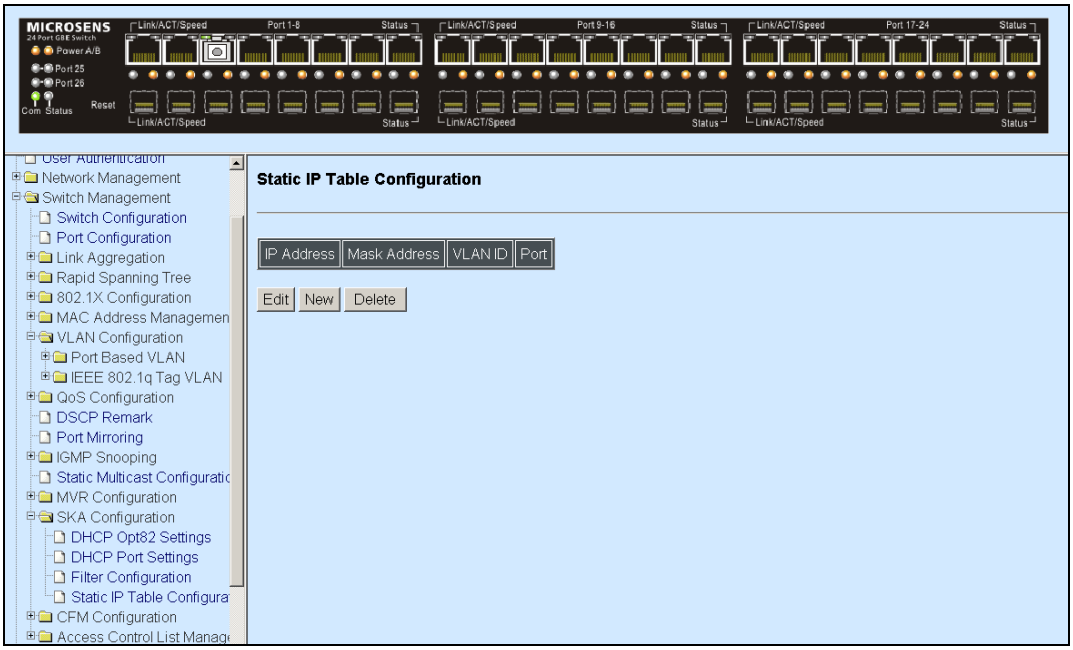
Port Isolation: If port isolation is set to “Enabled”, the customer port (port 1~22) can not communicate to each other.

IPv6 auto discovery/DHCPv6: Enable to filter IPv6 auto discovery and DHCPv6.

UPnP: Enable to filter UPnP packets.

4.4.14.4 Static IP Table Configuration

Select the option **Static IP Table Configuration** from the **SKA Configuration** menu and then the following screen page appears.



IP Address: View-only field that shows the current static IP address.

Mask Address: View-only field that shows the current Mask address.

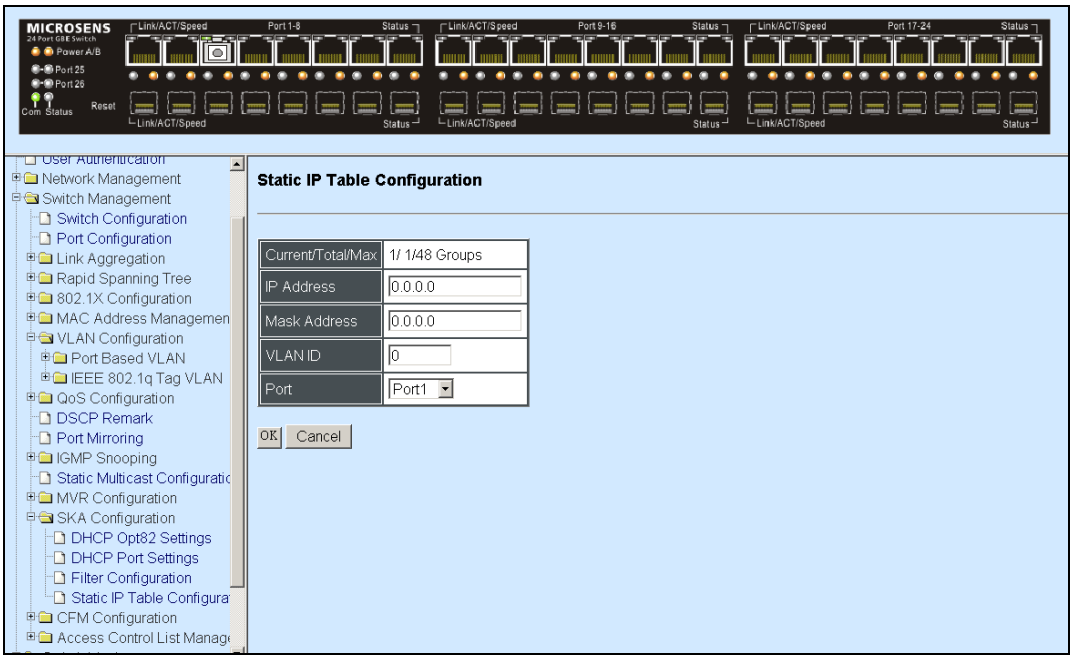
VLAN ID: View-only field that shows the VLAN ID.

Port: View-only field that shows the connection port number.

Click **New** to register a new Static IP address and then the following screen page appears.

Click **Edit** to edit and view Static IP Table settings.

Use **Delete** to remove a current Static IP address.



Current/Total/Max Group Nums: View-only field.

Current: This shows the number of current registered Static IP address(es).
Total: This shows the total number of registered Static IP address(es).
Max: This shows the maximum number available for Static ID address registration.

IP address: Specify an static IP address that you accept.

Mask Address: Specify the subnet mask address.

VLAN ID: Specify the VLAN ID. (0 means without VLAN ID)

Port: Specify the communication port number. (Port 1~22)

4.4.15 CFM Configuration

Ethernet Connectivity Fault Management (CFM) is an end-to-end and service-to-service Ethernet layer operations, administration and maintenance (OAM) 802.1ag protocol. It includes practical connectivity monitoring, fault verification and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.

As its name implies, IEEE 802.1ag focuses on the connectivity fault management which provides the following four features on each Virtual Local Area Network (VLAN) basis.

- **Fault Detection/Fault notification**
- **Fault verification**
- **Fault isolation**

Fault Detection/Fault notification

IEEE 802.1ag supports fault detection through Continuity Check Messages (CCM). CCM is somewhat like the “keep-alive” message. By default, every 802.1ag-capable network device (ND) sends out “heart-beat” style CCM periodically. Hence, by configuring a list of expected existent remote 802.1ag-capable NDs, the local 802.1ag-capable ND can detect the health status of its connection to the remote ND.

Fault verification

IEEE 802.1ag supports fault verification through Loopback Messages (LBM) and Loopback Reply (LBR). The LBM/LBR mechanism is similar to ICMP “ping” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault verification by ICMP “ping” in such a network environment.

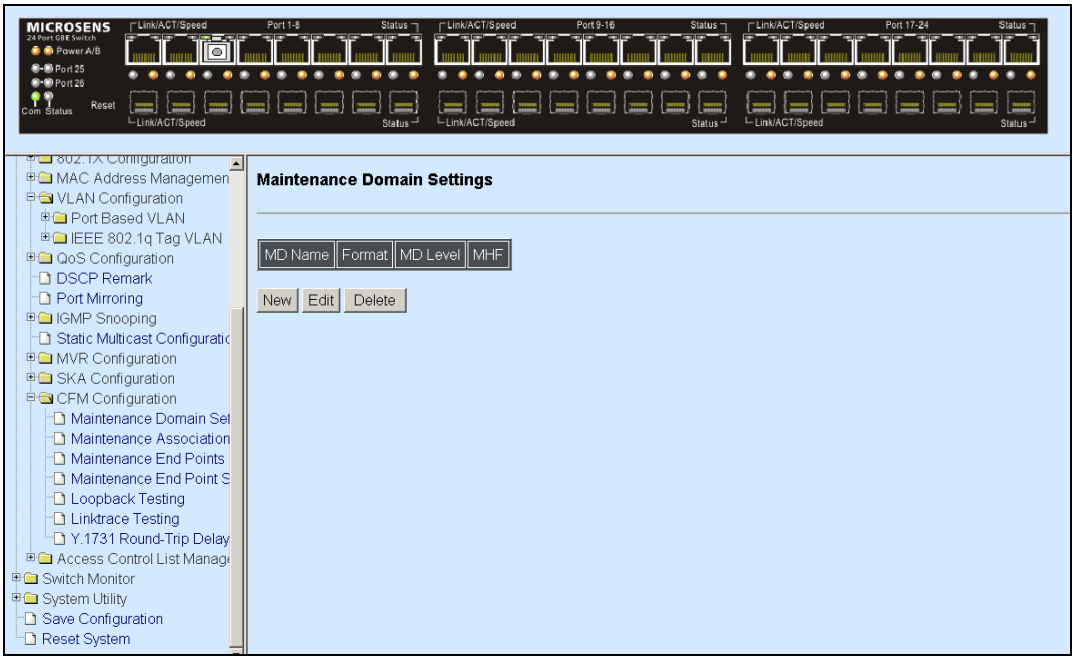
Fault isolation

In addition to the LBM/LBR mechanism, IEEE 802.1ag supports fault isolation through Linktrace Messages (LTM) and Linktrace Reply (LTR). The LTM/LTR mechanism is similar to the “trace route” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault isolation by “trace route” in such a network environment.

IEEE 802.1ag also defines the following network error status to be conveyed in the CCM.

- **MACstatus**
  Either some remote ND is reporting its interface as not ready to pass both the data packets and BPDU, or all remote NDs are reporting their interfaces as not able to pass ordinary data packets.
- **RemoteCCM**
  The ND is not receiving valid CCMs from at least one of the remote NDs.
- **ErrorCCM**
  The ND has received at least one invalid CCM whose CCM Interval has not yet timed out.
- **XconCCM**
  The ND has received at least one CCM from either another VLAN or a lower MD Level whose CCM Interval has not yet timed out.

Select the folder **CFM Configuration** from the **Switch Management** menu and then the following screen page appears.



Maintenance Domain Settings: To register or remove CFM Maintenance Domain.

Maintenance Association Settings: To register or remove CFM Maintenance Association under a Maintenance Domain.

Maintenance End Point List: To register or remove MEP ID from a Maintenance Association.

Maintenance End Port Settings: To configure MEP setting of the Managed Switch.

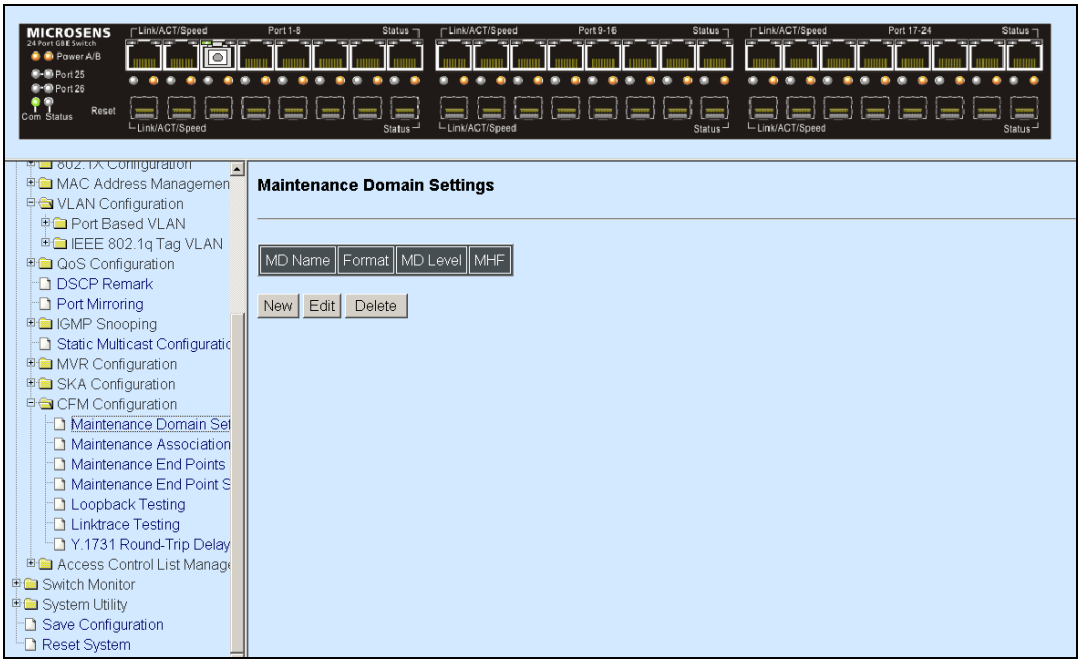
Loopback Testing: To activate Loopback test and configuration.

Linktrace Testing: To activate Link Trace route and configuration.

Y.1731 Round-Trip Delay Measurement: To activate Link Trace route and configuration.

4.4.15.1 Maintenance Domain

Select the option **Maintenance Domain Settings** from the **CFM Configuration** menu and then the following screen page appears.



MD Name: View-only field that shows the current CFM Service Domain of the Managed Switch.

Format: View-only field that shows the current Domain type (support string only).

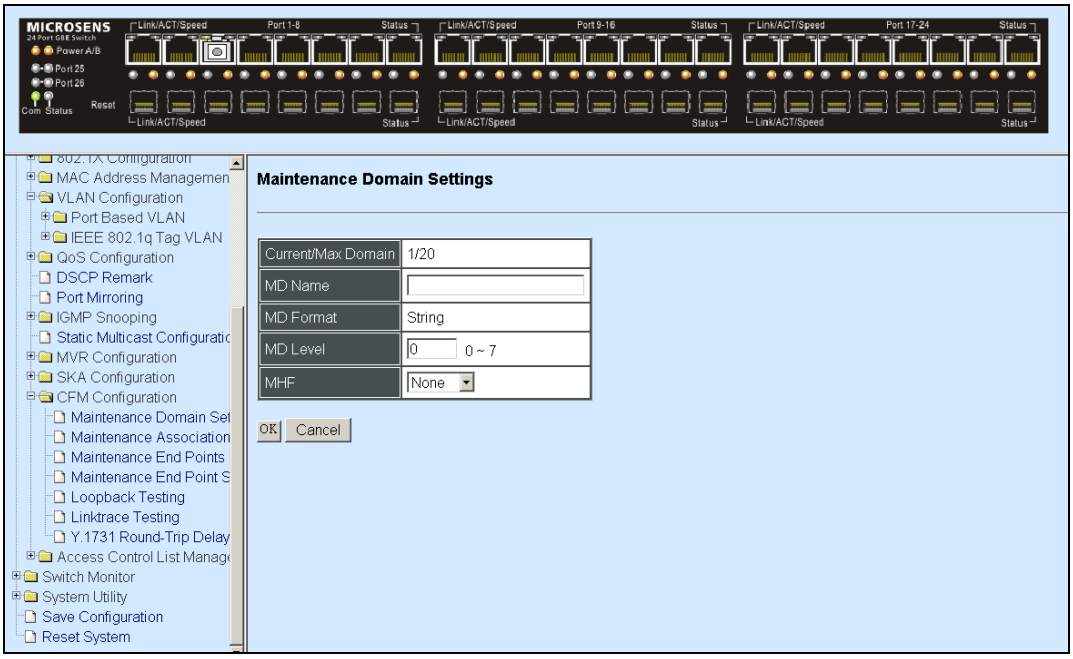
MD Level: View-only field that shows the Service Level of Domain.

MHF: View-only field that shows the “MIP Half Function” or “MEP Half Function”.

Click **New** to register a new Maintenance Domain and then the following screen page appears.

Click **Edit** to edit and view Maintenance Domain settings.

Click **Delete** to remove a current Maintenance Domain.



Current/Max Domain: View-only field.
Current: This shows the number of current registered Maintenance Domain.
Max: This shows the maximum number available for Maintenance Domain registration. The default number is 20.

MD Name: Specify a unique ID for a newly registered MD.

MD Format: Currently, the only supported MD format is “String”.

MD Level: Specify a service level.

MHF: Select an option for Maintenance Point Function from the pull-down menu.

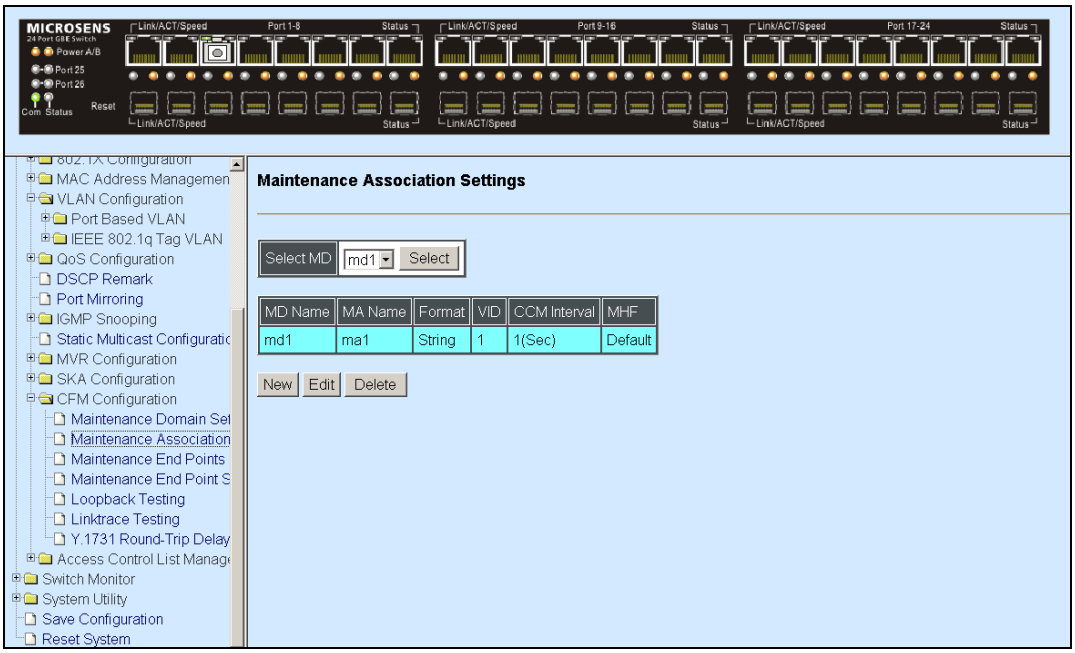
Default: MHFs can be created for this VID on any Bridge Port through which the VID can pass.

Explicit: MHFs can be created on CFM VLAN member port and only if there is a MEP at the lower active MD-level on the port.

None: No MHFs can be created for this VID.

4.4.15.2 Maintenance Association Settings

Select the option **Maintenance Association** from the **CFM Configuration** menu and then the following screen page appears.



Select MD: Select the Maintenance Domain that you would like to associate.

MA Name: Specify a MA name.

Format: Currently, the only supported format is “String”.

VID: Specify a registered VLAN ID for MA.

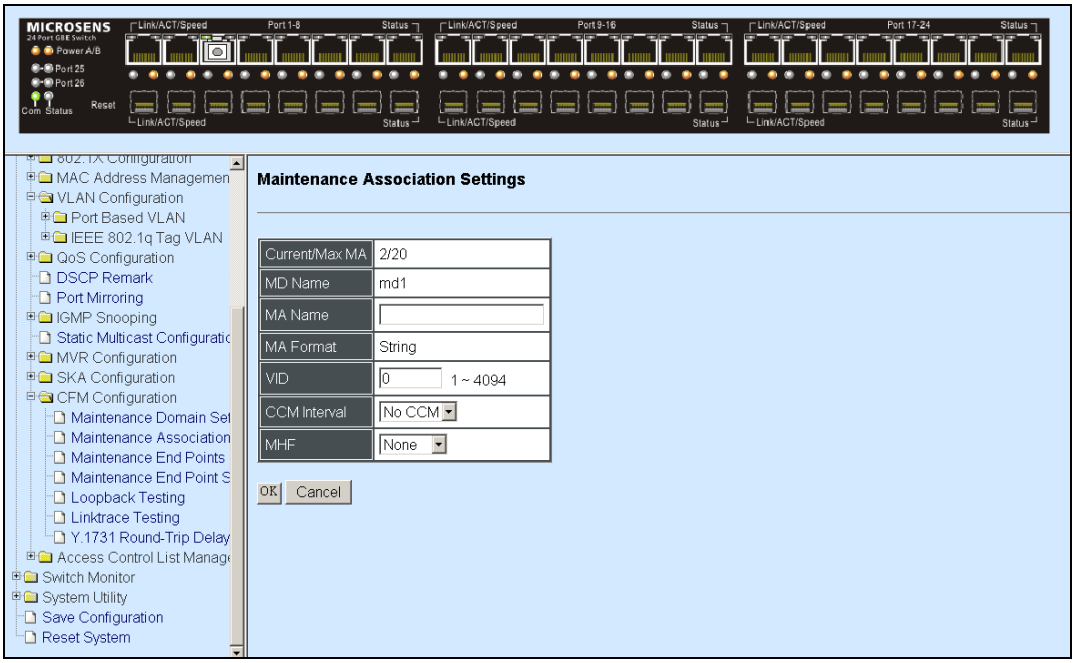
CCM Interval: Specify the time period to send connectivity check message (CCM).

MHF: View-only field that shows the “Defer”, “Default”, “Explicit”, or “None”

Click **New** to register a new Maintenance Association and then the following page appears.

Click **Edit** to edit and view Maintenance Association settings.

Click **Delete** to remove a current Maintenance Association.



Current/Max MA: View-only field.

Current: This shows the number of current registered MA.

Max: This shows the maximum number available for registering MA. The default number is 20.

MD Name: View-only field that show the selected MD Name.

MA Name: Specify a name for MA.

MA Format: View-only field. Currently, the only supported format is “String”.

VID: Specify a registered VLAN ID for MA.

CCM Interval: Configure the CCM Interval time from the pull-down menu.

MHF: Select an option for Maintenance Point Function from the pull-down menu.

Defer: The control of MHF creation is deferred to the corresponding variable in the enclosing Maintenance Domain.

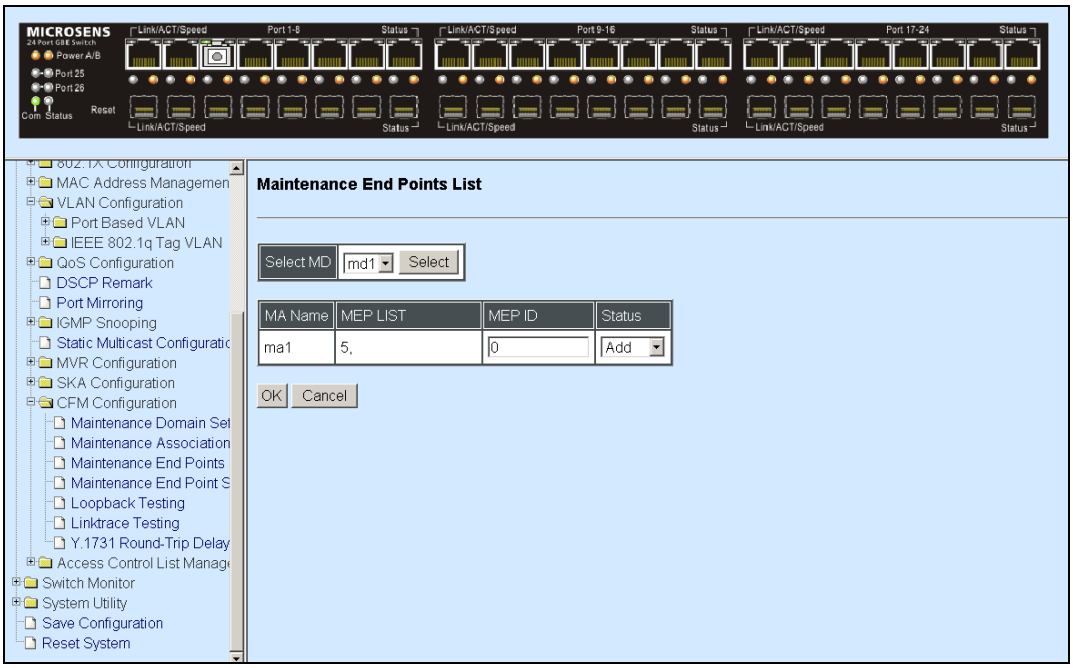
Default: MHFs can be created for this VID on any Bridge Port through which the VID can pass.

Explicit: MHFs can be created on CFM VLAN member port, and only if there is a MEP at the lower active MD-level on the port.

None: No MHFs can be created for this VID.

4.4.15.3 Maintenance End Point List

Select the option **Maintenance End Point List** from the **CFM Configuration** menu and then the following screen page appears.



MA Name: View-only field that shows the MA Name of the selected MD.

MEP LIST: View-only field that shows a list of remote MEP IDs.

MEP ID: Specify the remote MEP ID which you want to add or remove.

Status:

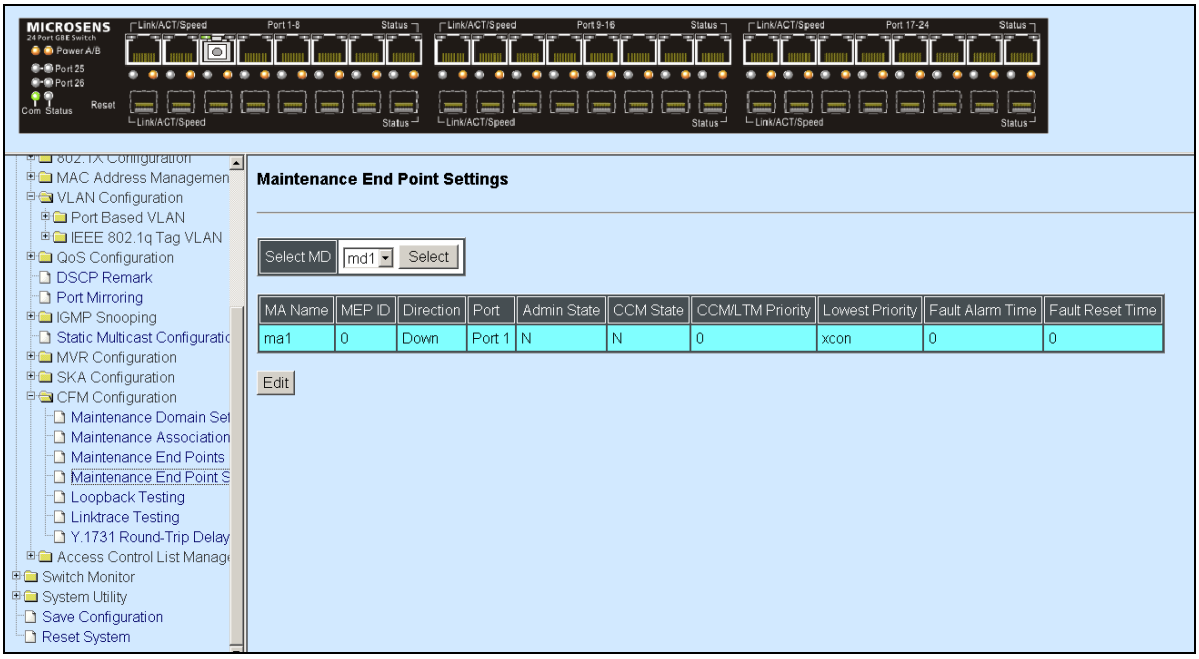
Idle: No actions will be taken.

Add: Insert a specified MEP ID to the MEP List.

Delete: Remove a specified MEP ID from the MEP List.

4.4.15.4 Maintenance End Point Settings

Select the option **Maintenance End Point Settings** from the **CFM Configuration** menu and then the following screen page appears.



Click "**Edit**" to edit or update the value of each field.

MA Name: View-only field that shows the MA Name of the selected MD.

MEP ID: Specify a MEP ID.

Direction: View-only field that shows the current Maintenance Point direction.

Port: Select a bridge port of the Maintenance Point.

Admin State: To enable or disable Admin State.

CCM State: To enable or disable CCM State.

CCM/LTM Priority: To configure the CCM/LTM priority from the pull-down menu.

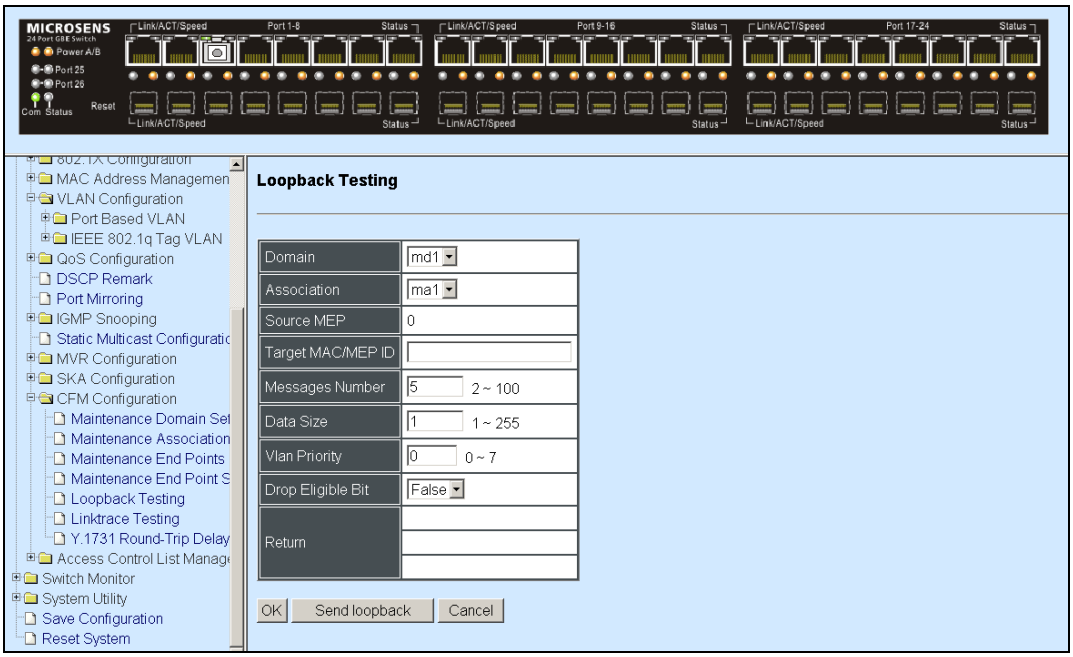
Lowest Priority: To configure the lowest priority from the pull-down menu.

Fault Alarm Time: Specify the Fault Alarm Time.

Fault Reset Time: Specify the Fault Reset Time.

4.4.15.5 Loopback Testing

Select the option **Loopback Testing** from the **CFM Configuration menu** and then the following screen page appears.



Domain: Select a registered MD.

Association: Select a current registered MA from the MD.

Source MEP: View-only field that shows the current MEP ID.

Target MAC/MEP ID: Specify the Target MEP ID or MAC for loopback test.

Messages Number: Specify the **LBM** Messages number for loopback test.

Data Size: Specify the Data Size for loopback test.

VLAN Priority: Specify the VLAN priority-bit for loopback test.

Drop Eligible Bit: Select “True” or “False” from the pull-down menu.

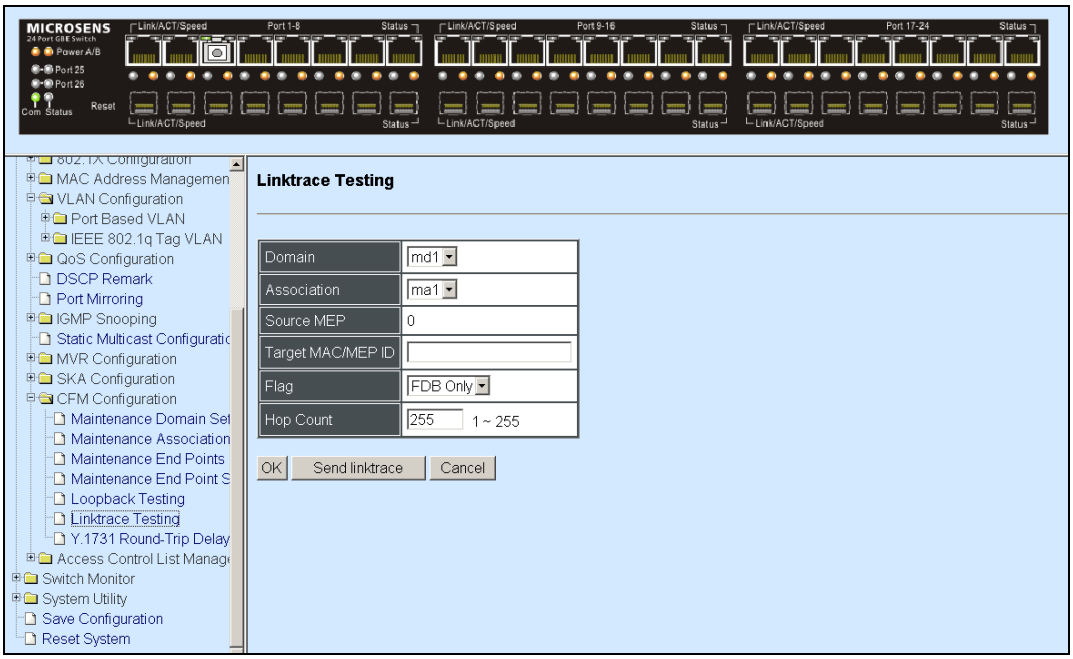
> **True:** Frames will be dropped first when the transfer rate is exceeded because they are less important.
>
> **False:** Frames will not be dropped first when the transfer rate is exceeded.

Return: View-only filed that shows the results of “Send loopback”.

Send loopback: Start loopback test.

4.4.15.6 Linktrace Testing

Select the option **Linktrace Testing** from the **CFM Configuration** menu and then the following screen page appears.



Domain: Select a current registered Maintenance Domain.

Association: Select a current registered Maintenance Association.

Source MEP: View-only field that shows the current MEP ID.

Target MAC/MEP ID: Specify the target MAC or MEP ID for linktrace test.

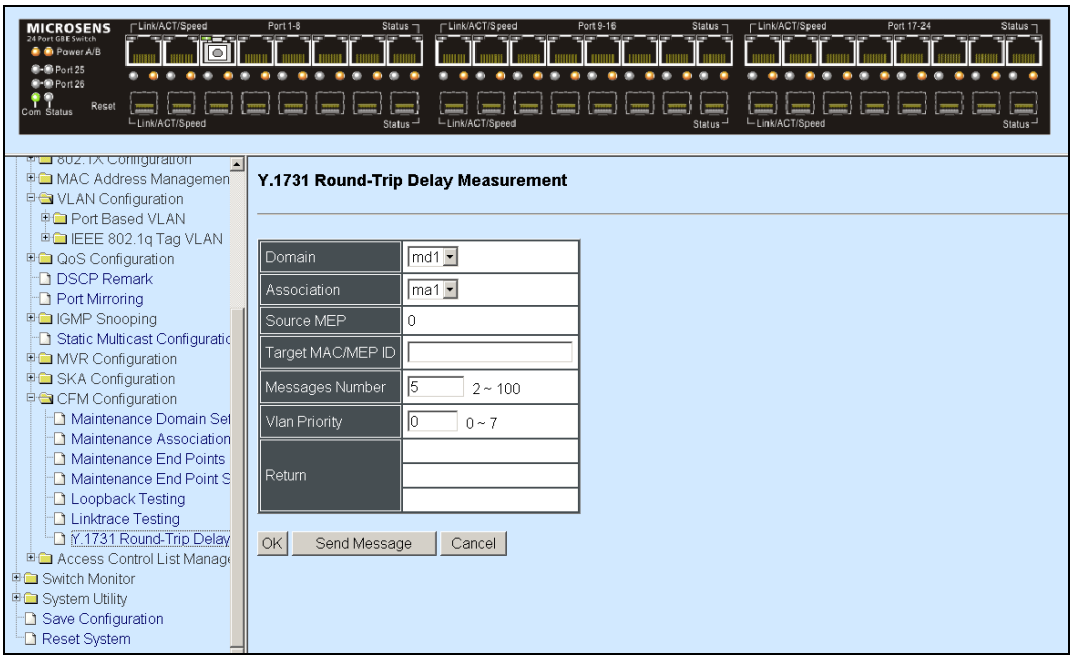
Flag: Select “FDB Only” or “None” from the pull-down menu.

Hop Count: Specify the Hop-count for linktrace test.

Send linktrace: Start linktrace test.

4.4.15.7 Y.1731 Round-Trip Delay Measurement

Select the option **Delay Measurement** from the **CFM Configuration** menu and then the following screen page appears.



Domain: Select a current registered Maintenance Domain.

Association: Select a current registered Maintenance Association.

Source MEP: View-only field that shows the current MEP ID.

Target MAC/MEP ID: Specify the target MAC or MEP ID for link trace test.

Messages Number: Specify the Number from 2~100.

VLAN Priority: Specify the VLAN priority-bit for loopback test.

Send Message: Start Delay Measurement.

4.4.16 Access Control List Management (ACLM)

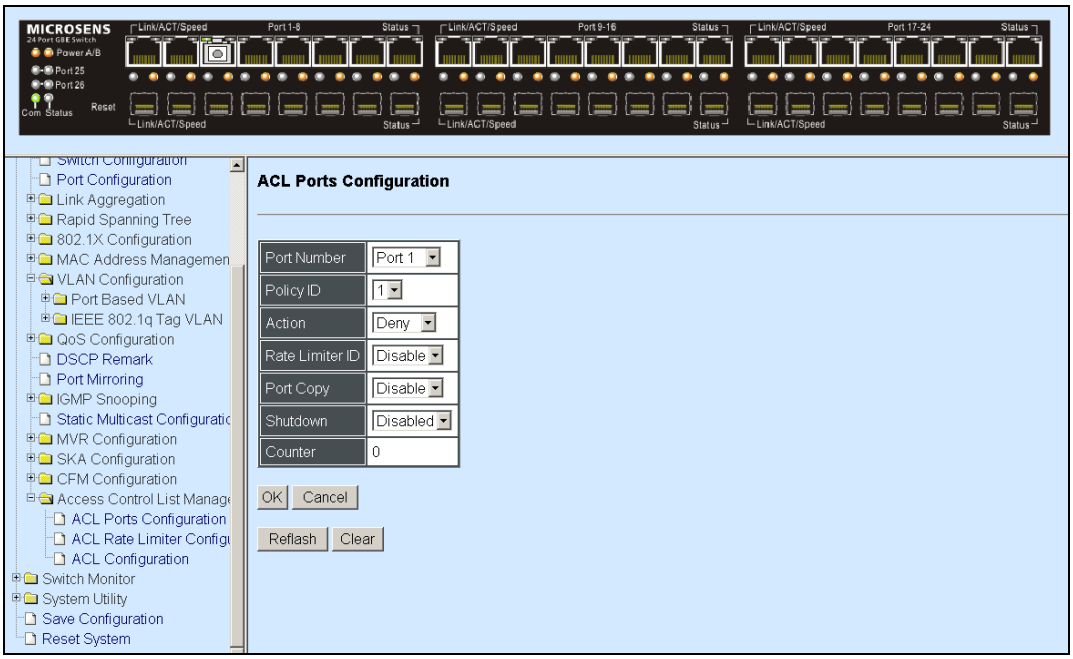
Creating an access control list allows users to define who has the authority to access information or perform tasks on the network. In the Managed Switch, users can establish rules applied to port numbers to permit or deny actions.

Select the folder **Access Control List Management** from the **Switch Management** menu and then the following screen page appears.

ACL Ports Configuration:

When information does not conform to MAC and VLAN parameters, actions set in ACL Ports

Configuration will be taken.



Port number: Select a port number.

Policy ID: Select a policy ID from the pull-down menu.

Action: Deny or permit the action.

Rate Limiter: Disable or enable rate limiter.

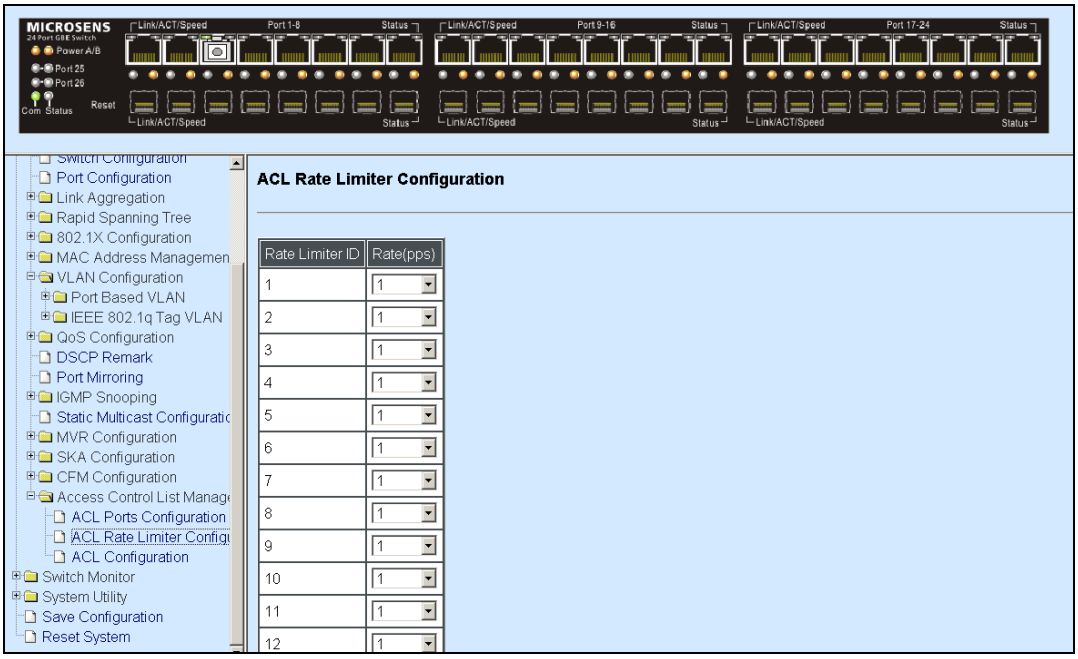
Port Copy: Send a copy to the desired port.

Shutdown: If enabled, the Managed Switch will shutdown interface.

Counter: View-only filed that shows how many packets conform to MAC and VLAN parameters.

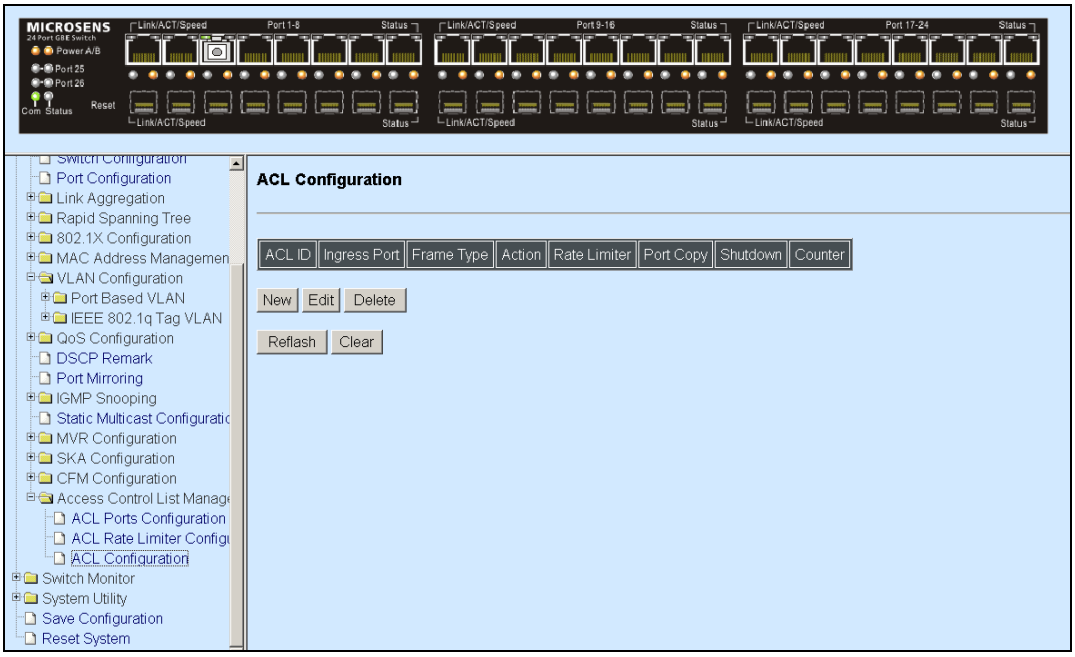
ACL Rate Limiter Configuration:

When Rate Limiter is enabled in ACL Configuration, rate of each Rate Limiter can be further specified.



Rate (pps): Select the rate for each Rate Limiter ID.

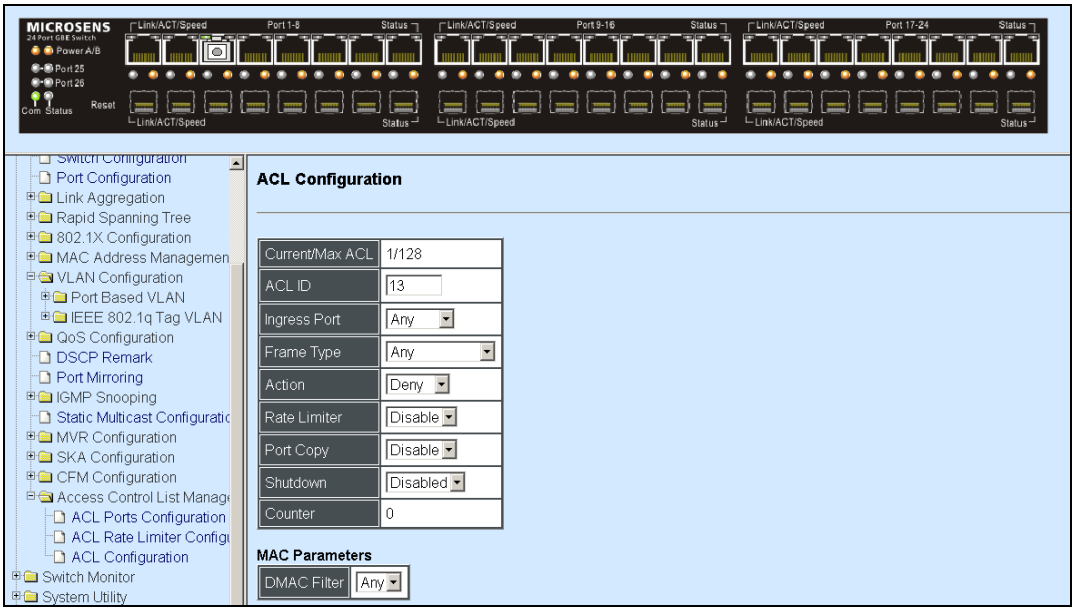
ACL Configuration:

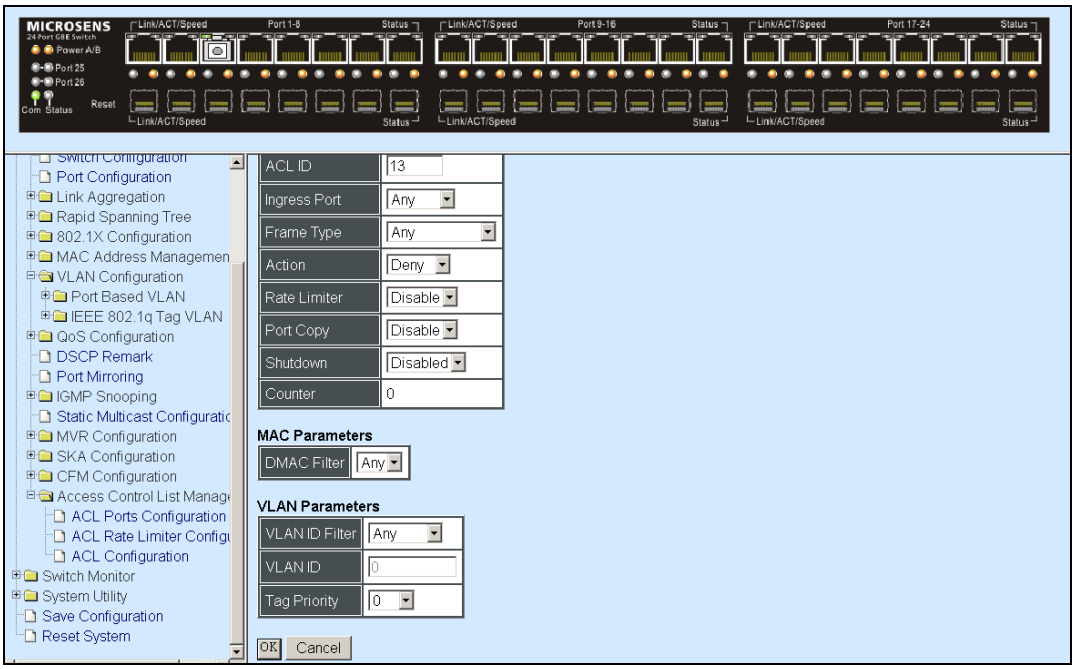


Click **New** to add a new ACL Configuration. The screen page is shown below.

Click **Delete** to remove a registered ACL configuration.

Click **Edit** to view and edit a registered ACL configuration.





MAC Parameters

DMAC Filter: Slect the DMAC Filter from the pull-down menu.

VLAN Parameters

VLAN ID Filter: Select “Any” or “Specific” for VLAN ID Filter.
VLAN ID: Specify a VLAN ID.
Tag Priority: Select the tag priority from the pull-down mneu.

When information conforms to MAC and VLAN parameters, then actions set in “Frame Type”, “Action”, “Rate Limiter”, “Port Copy”, and “Shutdown” will be taken into consideration.

Ingress Port: Select Policy 1~8 or the port number from the pull-down menu.

Frame Type: Select the desired frame type.

Action: Deny or permit the action.

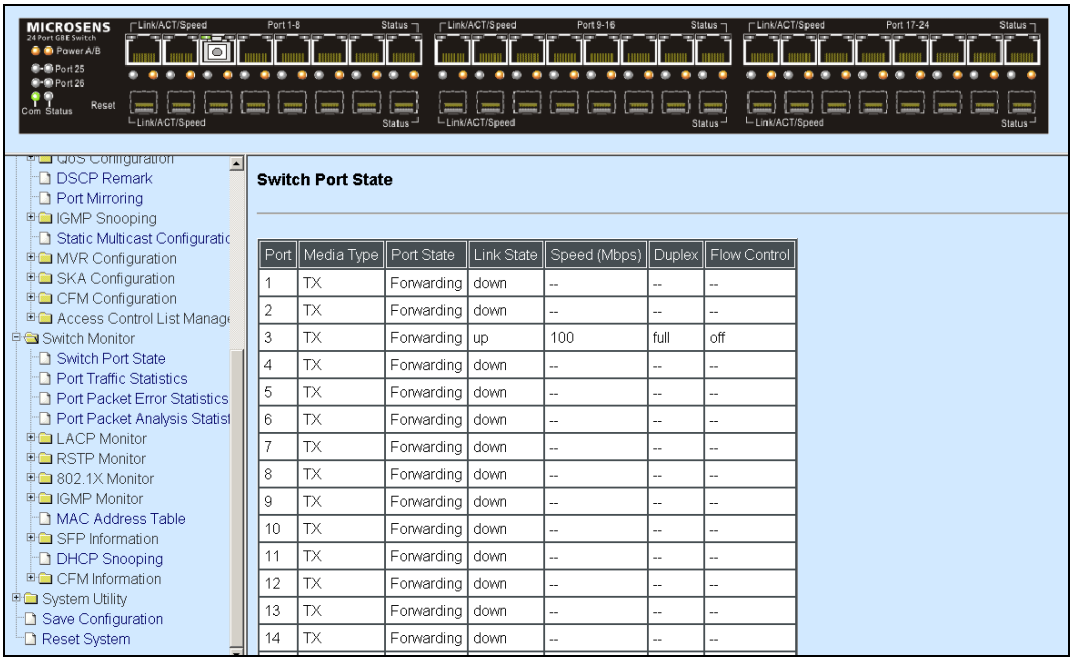
Rate Limiter: Disable or enable rate limiter.

Port Copy: Send a copy to the desired port.

Shutdown: If enabled, the Managed Switch will shutdown interface.

4.5 Switch Monitor

Switch Monitor allows users to monitor the real-time operation status of the Managed Switch. Users may monitor the port link-up status or traffic counters for maintenance or diagnostic purposes. Select the folder **Switch Monitor** from the Console main menu and then the following screen page appears.



1. **Switch Port State:** View current port media type, port state, etc.

2. **Port Traffic Statistics:** View each port's frames and bytes received or sent, utilization, etc.

3. **Port Packet Error Statistics:** View each port's traffic condition of error packets, e.g. CRC, fragment, Jabber, etc.

4. **Port Packet Analysis Statistics:** View each port's traffic condition of error packets, e.g. RX/TX frames of Multicast and Broadcast, etc.

5. **LACP Monitor:** View the LACP port status and statistics.

6. **RSTP Monitor:** View RSTP VLAN Bridge, Port Status, Statistics.

7. **802.1X Monitor:** View port status and Statistics.

8. **IGMP Monitor:** View-only field that shows IGMP status and Groups table.

9. **Mac Address Table:** List current MAC address learned by the Managed Switch.

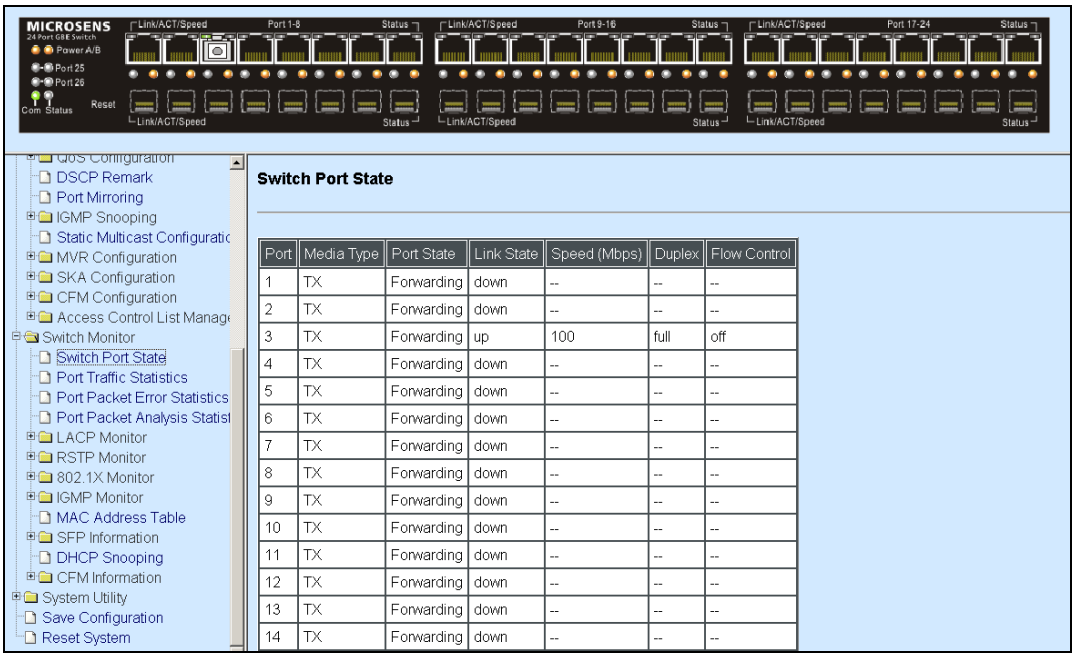
10. **SFP Information:** View the current port's SFP information, e.g. speed, Vendor ID, Vendor S/N, etc. SFP port state shows current DMI (Diagnostic monitoring interface) temperature, voltage, TX Bias, etc.

11. **DHCP Snooping:** View the DHCP learn table, etc.

12. **CFM Information:** View the current port's CFM information, e.g. CFM stack, CFM statistics, Maintenance End Point, Remote Maintenance End Points, Linktrace Reply.

4.5.1 Switch Port State

In order to view the real-time port status of the Managed Switch, select **Switch Port State** from the **Switch Monitor** menu and then the following screen page appears.



Switch Port State

Port	Media Type	Port State	Link State	Speed (Mbps)	Duplex	Flow Control
1	TX	Forwarding	down	--	--	--
2	TX	Forwarding	down	--	--	--
3	TX	Forwarding	up	100	full	off
4	TX	Forwarding	down	--	--	--
5	TX	Forwarding	down	--	--	--
6	TX	Forwarding	down	--	--	--
7	TX	Forwarding	down	--	--	--
8	TX	Forwarding	down	--	--	--
9	TX	Forwarding	down	--	--	--
10	TX	Forwarding	down	--	--	--
11	TX	Forwarding	down	--	--	--
12	TX	Forwarding	down	--	--	--
13	TX	Forwarding	down	--	--	--
14	TX	Forwarding	down	--	--	--

Port Number: The number of the port.

Media Type: The media type of the port, either TX or Fiber.

Port Sate: This shows each port's state which can be **D** (Disabled), **B/L** (Blocking/Listening), **L** (Learning) or **F** (Forwarding).

Disabled: A Port in this state does not participate in frame relay or the operation of the Spanning Tree Algorithm and Protocol if any.

Blocking/Listening:
Blocking: A Port in this state does not participate in frame relay; thus, it prevents frame duplication arising from multiple paths existing in the active topology of Bridged LAN.

Learning: A port in this state prepares to participate in frame relay. Frame relay is temporarily disabled in order to prevent temporary loops, which may occur in a Bridged LAN during the lifetime of this state as the active topology of the Bridged LAN changes. Learning is enabled to allow information to be acquired prior to frame relay in order to reduce the number of frames that are unnecessarily relayed.

Forwarding: A port in this state participates in frame relay. Packets can be forwarded only when port state is forwarding.

Link State: The current link status of the port, either up or down.

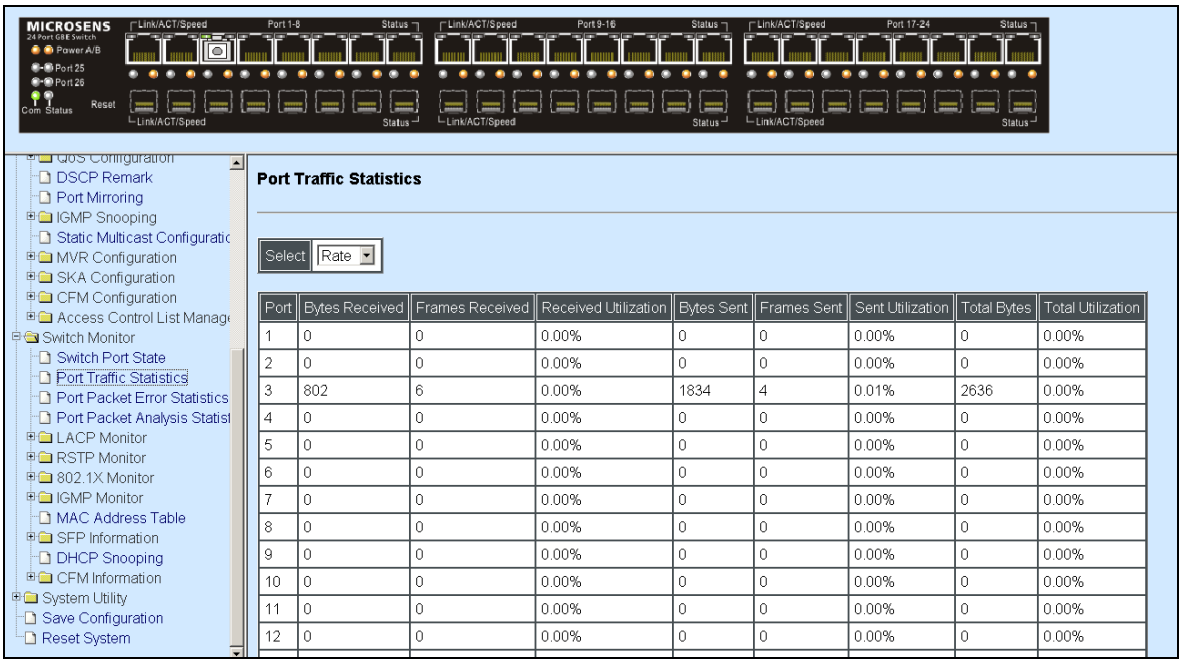
Speed (Mbps): The current operation speed of ports, which can be 10M, 100M or 1000M.

Duplex: The current operation Duplex mode of the port, either Full or Half.

Flow Control: The current state of Flow Control, either on or off

4.5.2 Port Traffic Statistics

In order to view the real-time port traffic statistics of the Managed Switch, select **Port Traffic Statistics** from the **Switch Monitor** menu and then the following screen page appears.



Port	Bytes Received	Frames Received	Received Utilization	Bytes Sent	Frames Sent	Sent Utilization	Total Bytes	Total Utilization
1	0	0	0.00%	0	0	0.00%	0	0.00%
2	0	0	0.00%	0	0	0.00%	0	0.00%
3	802	6	0.00%	1834	4	0.01%	2636	0.00%
4	0	0	0.00%	0	0	0.00%	0	0.00%
5	0	0	0.00%	0	0	0.00%	0	0.00%
6	0	0	0.00%	0	0	0.00%	0	0.00%
7	0	0	0.00%	0	0	0.00%	0	0.00%
8	0	0	0.00%	0	0	0.00%	0	0.00%
9	0	0	0.00%	0	0	0.00%	0	0.00%
10	0	0	0.00%	0	0	0.00%	0	0.00%
11	0	0	0.00%	0	0	0.00%	0	0.00%
12	0	0	0.00%	0	0	0.00%	0	0.00%

Select: Choose the Traffic Statistics from the pull-down menu.

Bytes Received: Total bytes received from each port.

Frames Received: Total frames received from each port.

Received Utilization: The ratio of each port receiving traffic and current port's total bandwidth.

Bytes Sent: The total bytes sent from current port.

Frames Sent: The total frames sent from current port.

Sent Utilization: The ratio of real port sending traffic ratio to current port of total bandwidth.

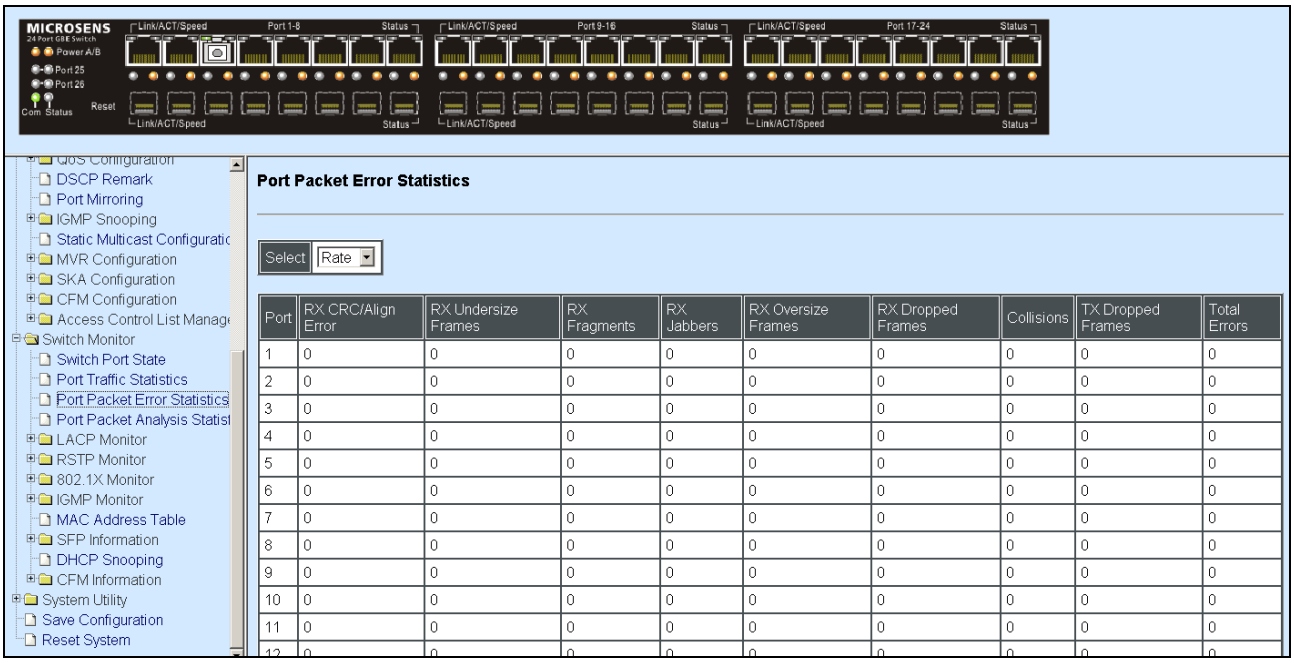
Total Bytes: Total bytes of receiving and send from current port.

Total Utilization: Real traffic of received and sent to current port of total bandwidth.

Clear All: This will clear all port's counter values and be set back to zero.

4.5.3 Port Packet Error

Port Packet Error Statistics mode counters allow users to view the port error of the Managed Switch. The event mode counter is calculated since the last time that counter was reset or cleared. Select **Port Packet Error Statistics** from the **Switch Monitor** menu and then the following screen page appears.



Select: Choose the Packet Error Statistics from the pull-down menu.

RX CRC/Align Error: CRC/Align Error frames received.

RX Undersize Frames: Undersize frames received.

RX Fragments Frames: Fragments frames received.

RX Jabber Frames: Jabber frames received.

RX Oversize Frames: Oversize frames received.

RX Dropped Frames: Drop frames received.

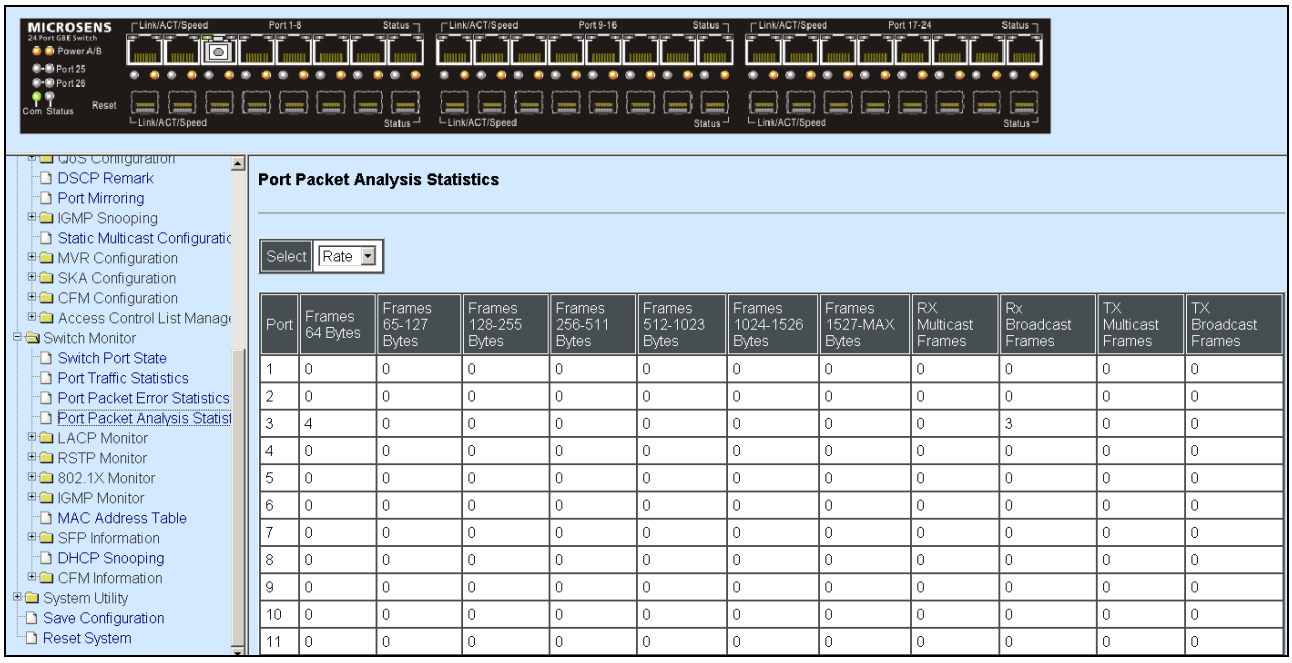
Collision: Each port's Collision frames.

TX Dropped Frames: Drop frames sent.

Clear All: This will clear all port's counter values and be set back to zero.

4.5.4 Port Packet Analysis Statistics

Port Packet Analysis Statistics Mode Counters allow users to view the port analysis history of the Managed Switch. Event mode counters are calculated since the last time that counter was reset or cleared. Select **Port Packet Analysis Statistics** from the **Switch Monitor** menu and then the following screen page appears.



Select: Rate

Port	Frames 64 Bytes	Frames 65-127 Bytes	Frames 128-255 Bytes	Frames 256-511 Bytes	Frames 512-1023 Bytes	Frames 1024-1526 Bytes	Frames 1527-MAX Bytes	RX Multicast Frames	Rx Broadcast Frames	TX Multicast Frames	TX Broadcast Frames
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	0	0	0	0	0	3	0	0
4	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0

Select: Choose the Packet Error Statistics from the pull-down menu.

Frames 64 Bytes: 64 bytes frames received.

Frames 65-127 Bytes: 65-127 bytes frames received.

Frames 128-255 Bytes: 128-255 bytes frames received.

Frames 256-511 Bytes: 256-511 bytes frames received.

Frames 512-1023 Bytes: 512-1023 bytes frames received.

Frames 1024-1518 Bytes: 1024-1518 bytes frames received.

Frames 1519-MAX Bytes: Over 1519 bytes frames received.

Multicast Frames RX: Good multicast frames received.

Broadcast Frames RX: Good broadcast frames received.

Multicast frames TX: Good multicast packets sent.

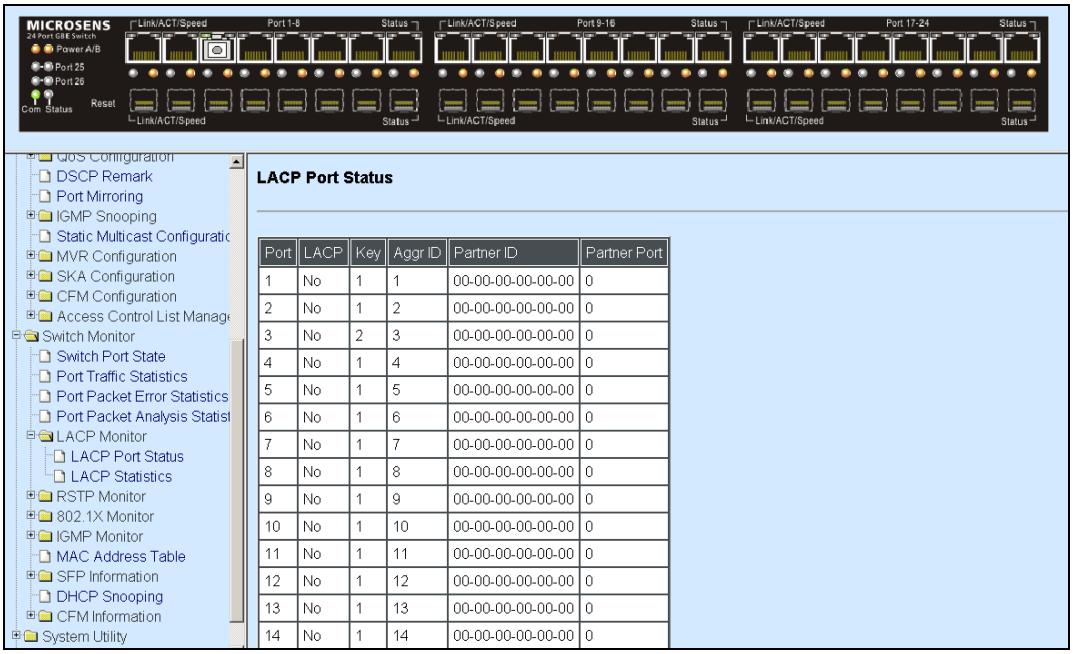
Broadcast Frames TX: Good broadcast packets sent.

Clear all: This will clear all port's counter values and be set back to zero.

4.5.5 LACP Monitor

4.5.5.1 LACP Port Status

LACP Port Status allows users to view a list of all LACP ports' information. Select **LACP Port Status** from the **LACP monitor** menu and then the following screen page appears.



Port	LACP	Key	Aggr ID	Partner ID	Partner Port
1	No	1	1	00-00-00-00-00-00	0
2	No	1	2	00-00-00-00-00-00	0
3	No	2	3	00-00-00-00-00-00	0
4	No	1	4	00-00-00-00-00-00	0
5	No	1	5	00-00-00-00-00-00	0
6	No	1	6	00-00-00-00-00-00	0
7	No	1	7	00-00-00-00-00-00	0
8	No	1	8	00-00-00-00-00-00	0
9	No	1	9	00-00-00-00-00-00	0
10	No	1	10	00-00-00-00-00-00	0
11	No	1	11	00-00-00-00-00-00	0
12	No	1	12	00-00-00-00-00-00	0
13	No	1	13	00-00-00-00-00-00	0
14	No	1	14	00-00-00-00-00-00	0

In this page, you can find the following information of a LACP port:

Port Number: The number of the port.

Partner ID: The current operational key for the LACP group.

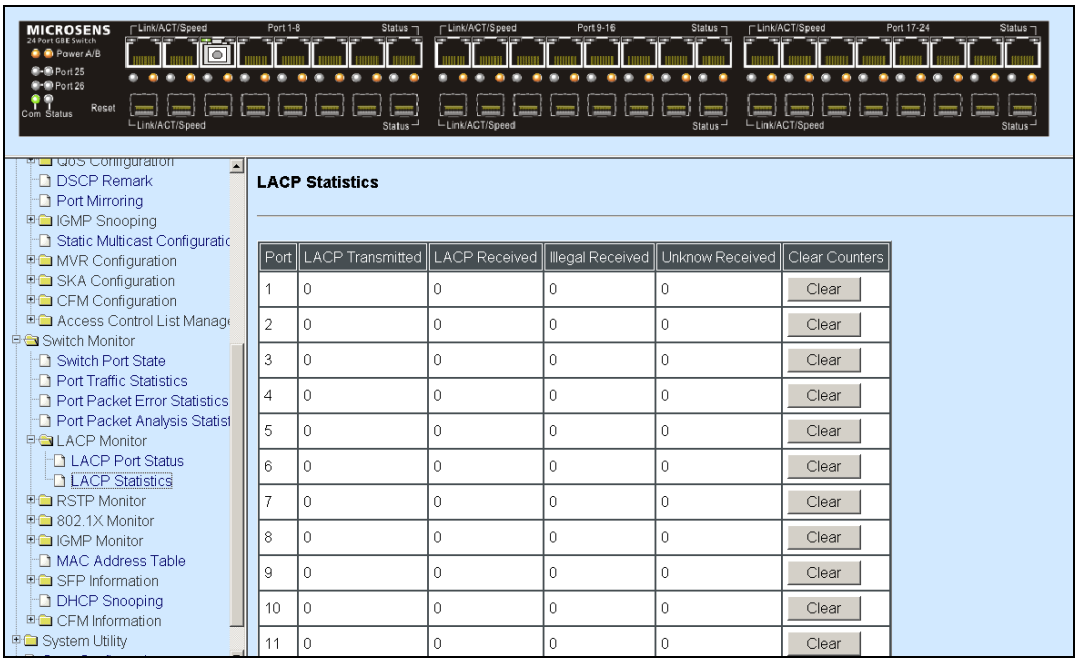
In LACP mode, link aggregation control protocol data unit (LACPDU) is used for exchanging information among LACP-enabled devices. After LACP is enabled on a port, the port sends LACPDUs to notify the remote system of its system LACP priority, system MAC address, port LACP priority, port number and operational key. Upon receipt of an LACPDU, the

remote system compares the received information with the information received on other ports to determine the ports that can operate as selected ports. This allows the two systems to reach an agreement on the states of the related ports when aggregating ports, link aggregation control automatically assigns each port an operational key based on its rate, duplex mode and other basic configurations. In an LACP aggregation group, all ports share the same operational key; in a manual or static LACP aggregation, the selected ports share the same operational key.

Partner Port: The corresponding port numbers that connect to the partner switch in LACP mode.

4.5.5.2 LACP Statistics

In order to view the real-time LACP statistics status of the Managed Switch, select **LACP Statistics** from the **LACP Monitor** menu and then the following screen page appears.



Port: LACP packets (LACPDU) transmitted or received from current port.

LACP Transmitted: Packets transmitted from current port.

LACP Received: Packets received form current port.

Illegal Received: Illegal packets received from current port.

Unknown Received: Unknown packets received from current port.

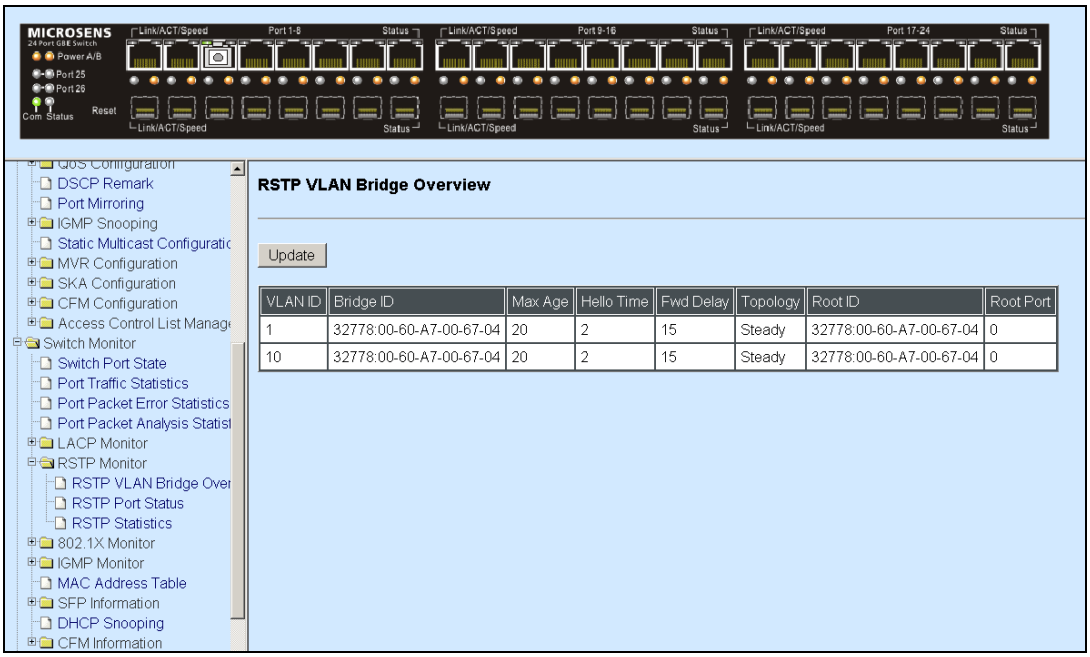
Clear Counter: Clear counter of current port.

4.5.6 RSTP Monitor

4.5.6.1 RSTP VLAN Bridge Overview

In this option, the RSTP status of the Managed Switch will be shown.

RSTP VLAN Bridge Overview allows users to view a list of all RSTP VLANs' brief information, such as, VLAN ID, Bridge ID, topology status and Root ID and to obtain detailed VLAN information after selecting. Select **RSTP VLAN Bridge Overview** from the **RSTP Monitor** menu and then the following screen page appears.



In this page, you can find the following information in a RSTP VLAN bridge:

Update: Update the current status.

VLAN ID: VID of the specific VLAN

Bridge ID: RSTP Bridge ID of the Managed Switch in a specific VLAN.

Max Age: Max Age setting of the Managed Switch in a specific VLAN.

Hello Time: Hello Time setting of the Managed Switch in a specific VLAN.

Forward Delay: The Managed Switch's setting of Forward Delay Time in a specific VLAN.

Topology: The state of the topology.

Topology Count: The count of the topology changing.

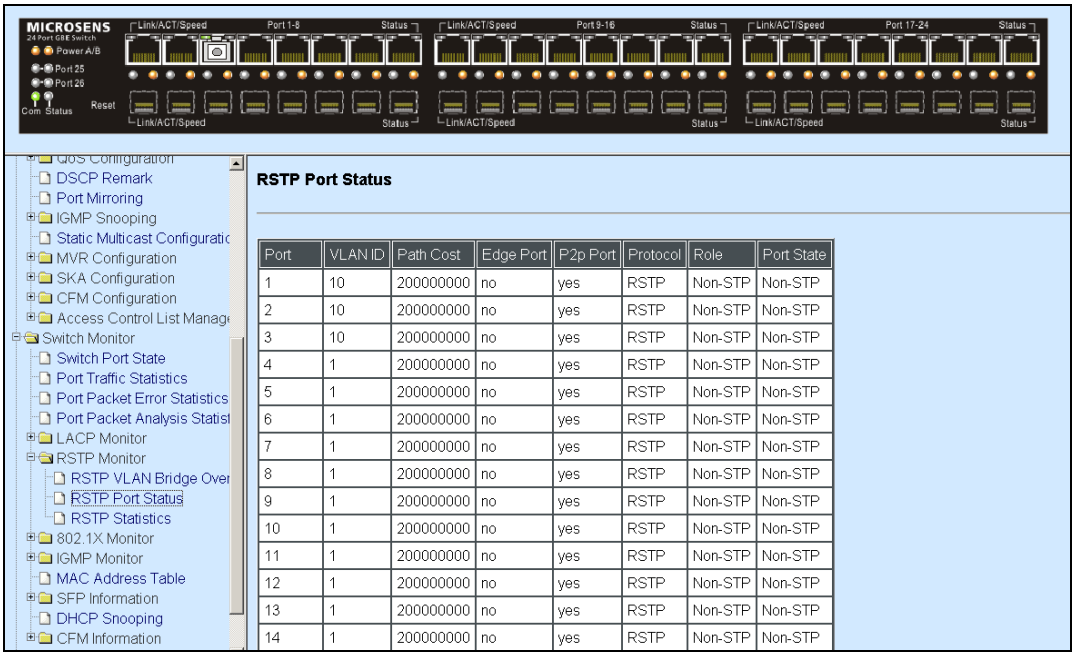
Last topology: The state of last topology.

Root ID: Display this Managed Switch's Root ID.

Root port: Display this Managed Switch's Root Port Number.

4.5.6.2 RSTP Port Status

RSTP Port Status allows users to view a list of all RSTP ports' information. Select **RSTP Port Status** from the **RSTP Monitor** menu and then the following screen page appears.



RSTP Port Status

Port	VLAN ID	Path Cost	Edge Port	P2p Port	Protocol	Role	Port State
1	10	200000000	no	yes	RSTP	Non-STP	Non-STP
2	10	200000000	no	yes	RSTP	Non-STP	Non-STP
3	10	200000000	no	yes	RSTP	Non-STP	Non-STP
4	1	200000000	no	yes	RSTP	Non-STP	Non-STP
5	1	200000000	no	yes	RSTP	Non-STP	Non-STP
6	1	200000000	no	yes	RSTP	Non-STP	Non-STP
7	1	200000000	no	yes	RSTP	Non-STP	Non-STP
8	1	200000000	no	yes	RSTP	Non-STP	Non-STP
9	1	200000000	no	yes	RSTP	Non-STP	Non-STP
10	1	200000000	no	yes	RSTP	Non-STP	Non-STP
11	1	200000000	no	yes	RSTP	Non-STP	Non-STP
12	1	200000000	no	yes	RSTP	Non-STP	Non-STP
13	1	200000000	no	yes	RSTP	Non-STP	Non-STP
14	1	200000000	no	yes	RSTP	Non-STP	Non-STP

In this page, you can find the following information of a RSTP port:

Port Number: The number of the port.

VLAN ID: The VID of the VLAN that this port belongs to.

Path Cost: The Path Cost of the port.

Edge Port: "Yes" is displayed if the port is the Edge port connecting to an end station and does not receive BPDU.

P2p Port: "Yes" is displayed if the port link is connected to another STP device.

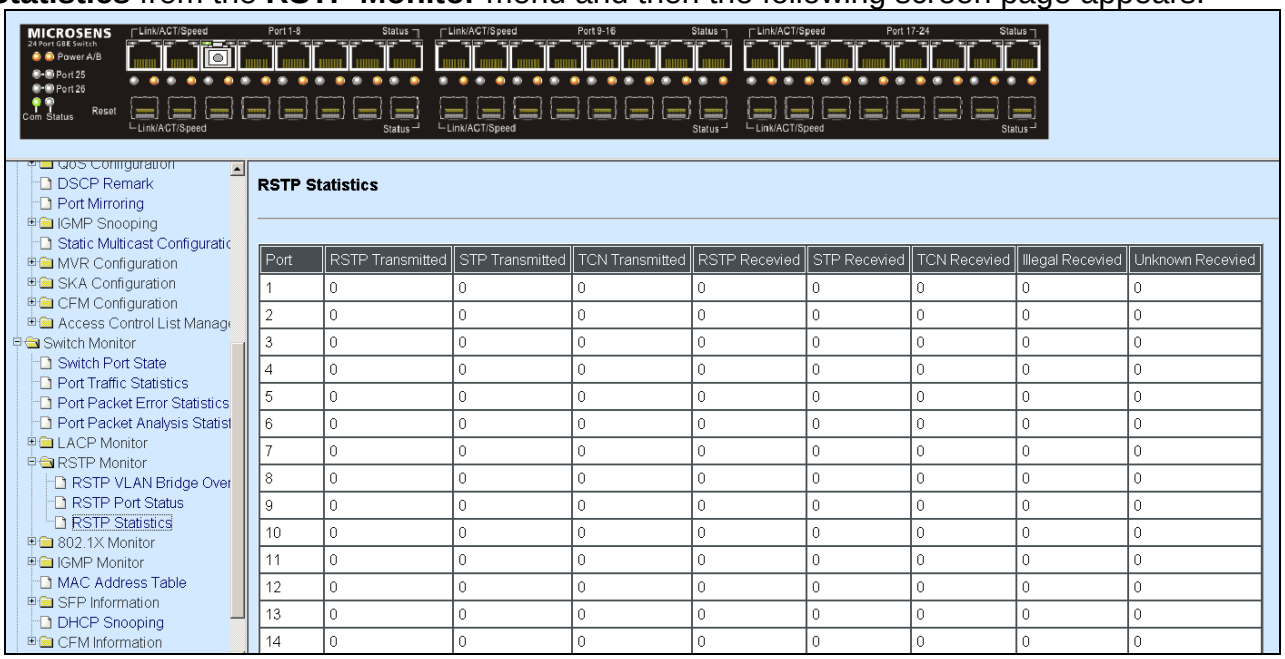
Protocol: Display RSTP or STP.

Role: Display the Role of the port (non-STP, forwarding or blocked).

Port State: Display the state of the port (non-STP, forwarding or blocked).

4.5.6.3 RSTP Statistics

In order to view the real-time RSTP statistics status of the Managed Switch, select **RSTP Statistics** from the **RSTP Monitor** menu and then the following screen page appears.



Port	RSTP Transmitted	STP Transmitted	TCN Transmitted	RSTP Received	STP Received	TCN Received	Illegal Received	Unknown Received
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0

RSTP Transmitted: The total transmitted RSTP packets from current port.

STP Transmitted: The total transmitted STP packets from current port.

TCN Transmitted: The total transmitted TCN (Topology Change Notification) packets from current port.

RSTP Received: The total received RSTP packets from current port.

STP Received: The total received STP packets from current port.

TCN Received: The total received TCN packets from current port.

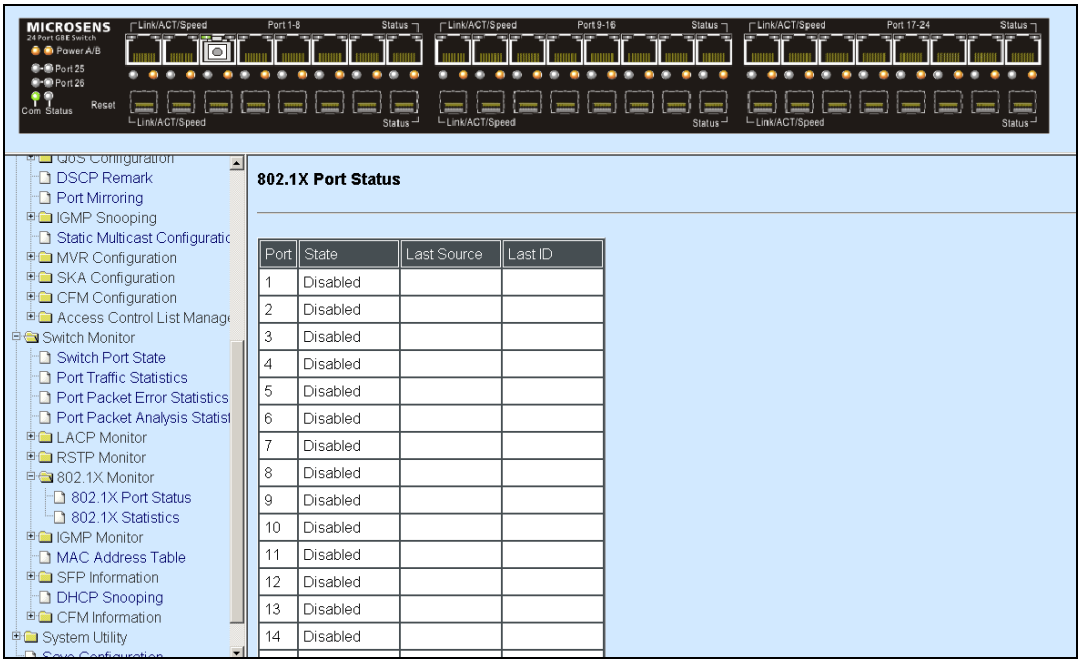
Illegal Received: The total received illegal packets from current port.

Unknown Received: The total received unknown packets from current port.

4.5.7 802.1X Monitor

4.5.7.1 80.2.1X Port Status

802.1X Port Status allows users to view a list of all 802.1x ports' information. Select **802.1X port status** from the **802.1x Monitor** menu and then the following screen page appears.



In this page, you can find the following information of a 802.1x port:

Port: The number of the port.

State: Display the number of the port 802.1x link state LinkDown or LinkUp.

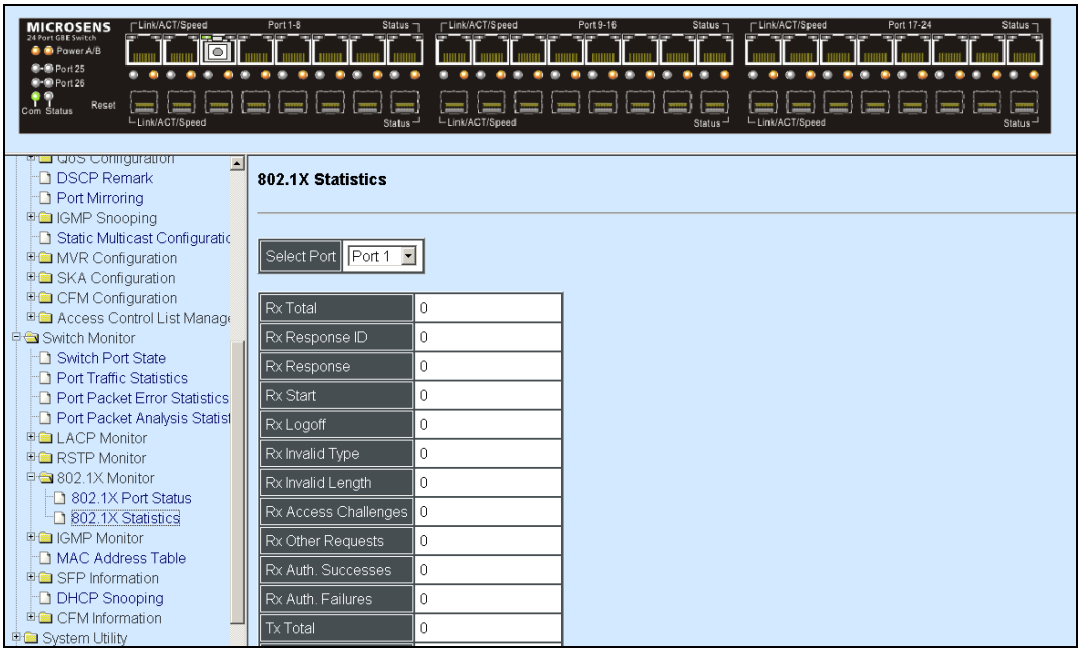
Last Source: Display the number of the port's Last Source.

Last ID: Display the number of the port's Last ID.

4.5.7.2 802.1X Statistics

In order to view the real-time 802.1x port statistics status of the Managed Switch, select **802.1x Statistics** from the **802.1x Monitor** menu and then the following screen page shows up.

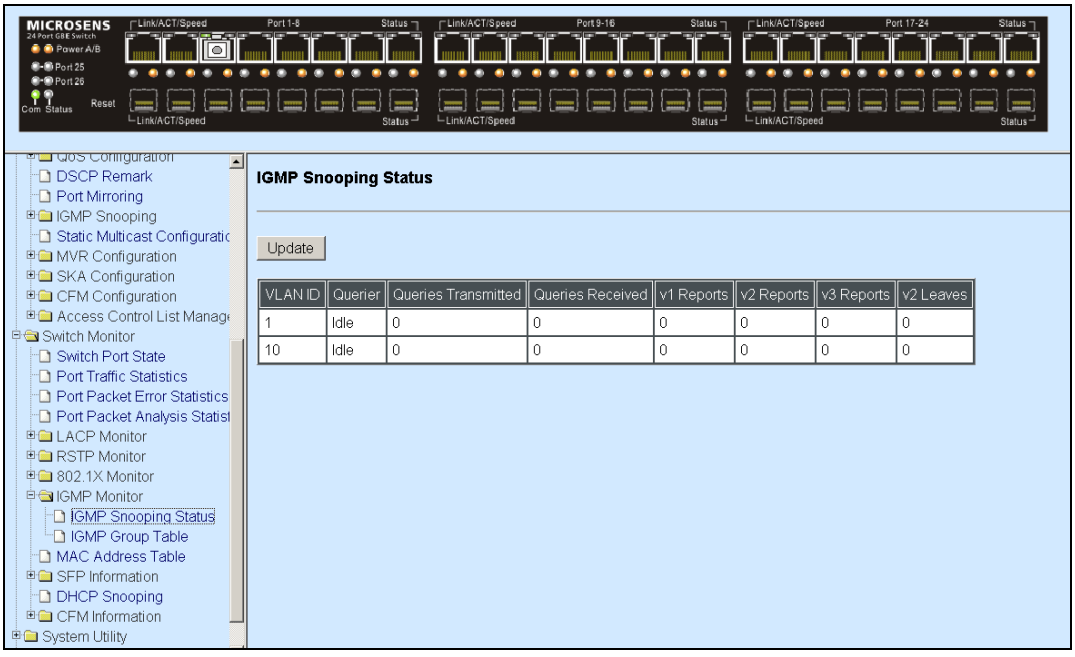
Select the port number from the pull-down menu to view statistics.



4.5.8 IGMP Snooping Status

4.5.8.1 Snooping Status

IGMP Snooping Status allows users to view a list of IGMP queries' information in VLAN(s) such as VLAN ID, Querier and Queries Transmitted/Received packets. Select **IGMP Snooping Status** from the **IGMP Monitor** menu and then the following screen page appears.



Update: Click "Update" to update the table.

VLAN ID: VID of the specific VLAN

The IGMP querier periodically sends IGMP general queries to all hosts and routers (224.0.0.1) on the local subnet to find out whether active multicast group members exist on the subnet.

Upon receiving an IGMP general query, the Managed Switch forwards it through all ports in the VLAN except the receiving port.

Querier: The state of IGMP querier in the VLAN.

Queries Transmitted: The total IGMP general queries transmitted will be sent to IGMP hosts.

Queries Received: The total received IGMP general queries from IGMP querier.

v1 Reports: IGMP Version 1 reports.

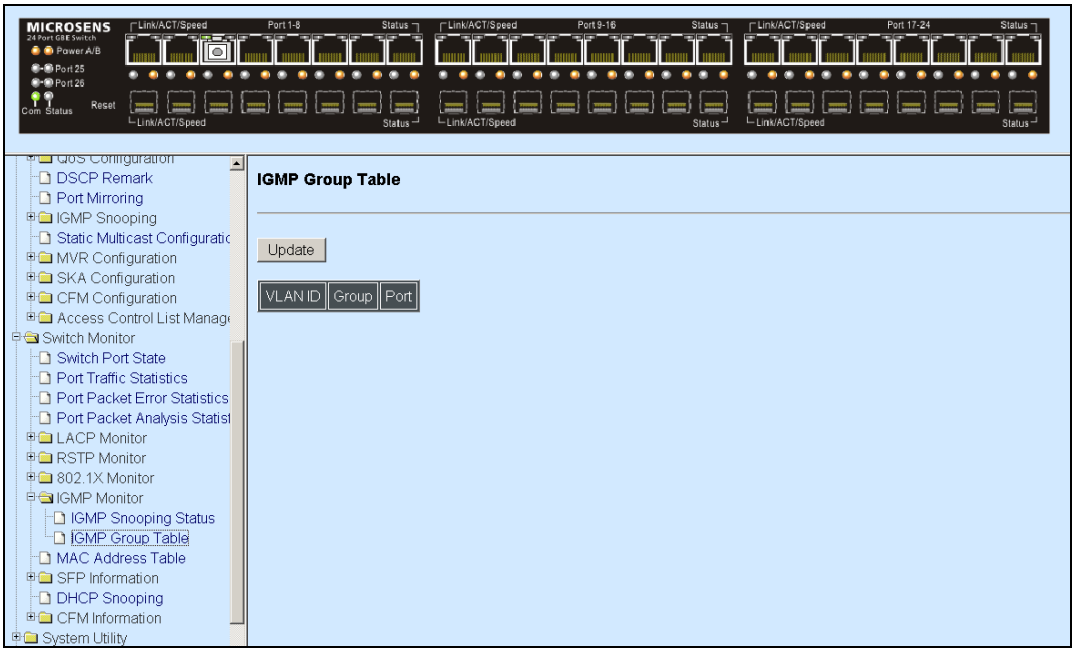
v2 Reports: IGMP Version 2 reports.

v3 Reports: IGMP Version 3 reports.

v2 Leaves: IGMP Version 2 leaves.

4.5.8.2 IGMP Group Table

In order to view the real-time IGMP multicast group status of the Managed Switch, select **IGMP Group Table** from the **IGMP monitor** menu and then the following screen page appears.



Update: Click “Update” to update the table.

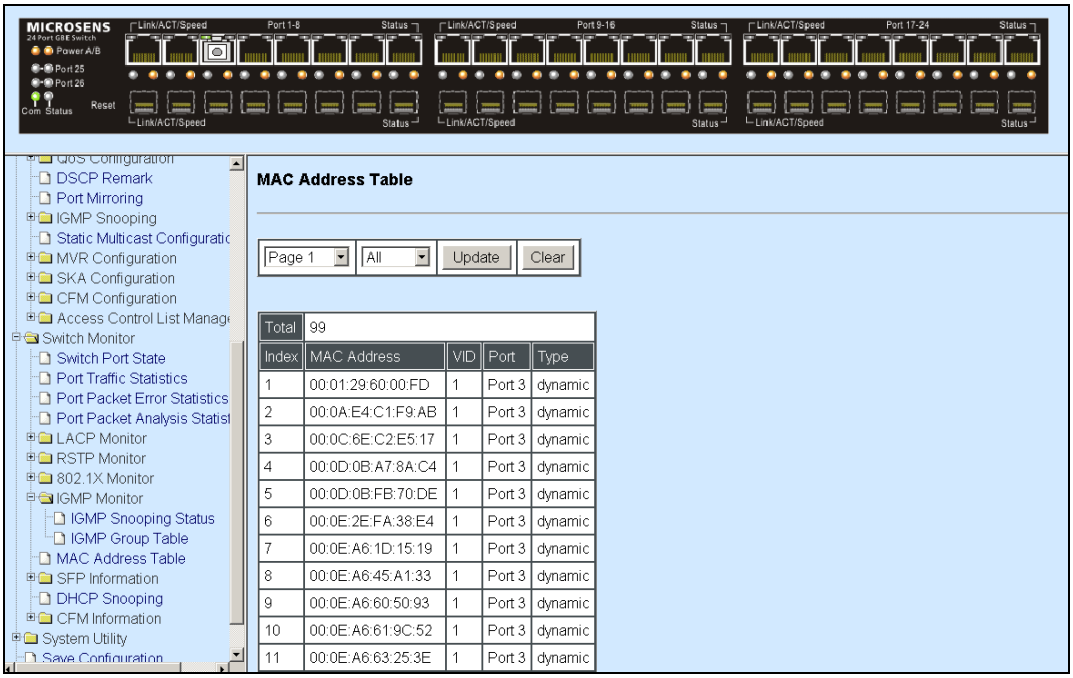
VLAN ID: VID of the specific VLAN

Group: The multicast IP address of IGMP querier.

Port: The port(s) grouped in the specific multicast group.

4.5.9 MAC Address Table

MAC Address Table displays MAC addresses learned when System Reset and MAC Address Learning are enabled.



The table above shows the MAC addresses learned from each port of the Managed Switch.

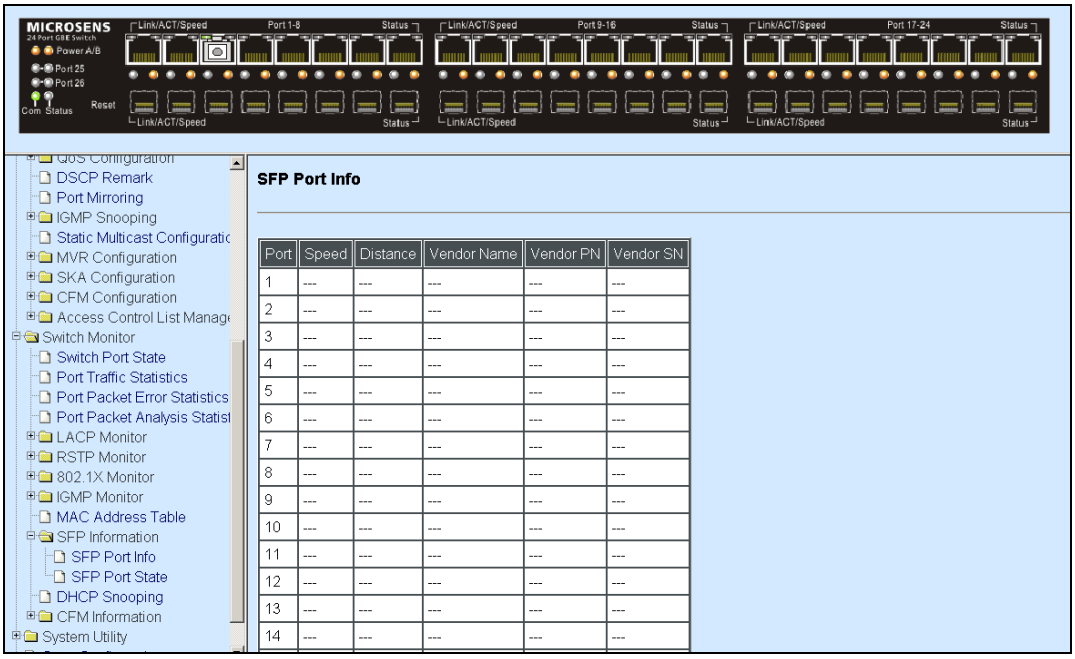
Click **Update** to update the MAC Address Table.

Click **Clear** to clear the MAC Address table.

4.5.10 SFP Information

4.5.10.1 SFP Port Information

SFP Information displays each port's slide-in SFP Transceiver information e.g. Speed, Length, Vendor Name, Vendor PN, Vendor SN, and detection Temperature, Voltage , TX Bias, etc. Select **SFP Port Info** from the **SFP Information** menu and then the following screen page appears.



Port: The number of the port.

Speed: Data rate of the slide-in SFP Transceiver.

Distance: Transmission distance of the slide-in SFP Transceiver.

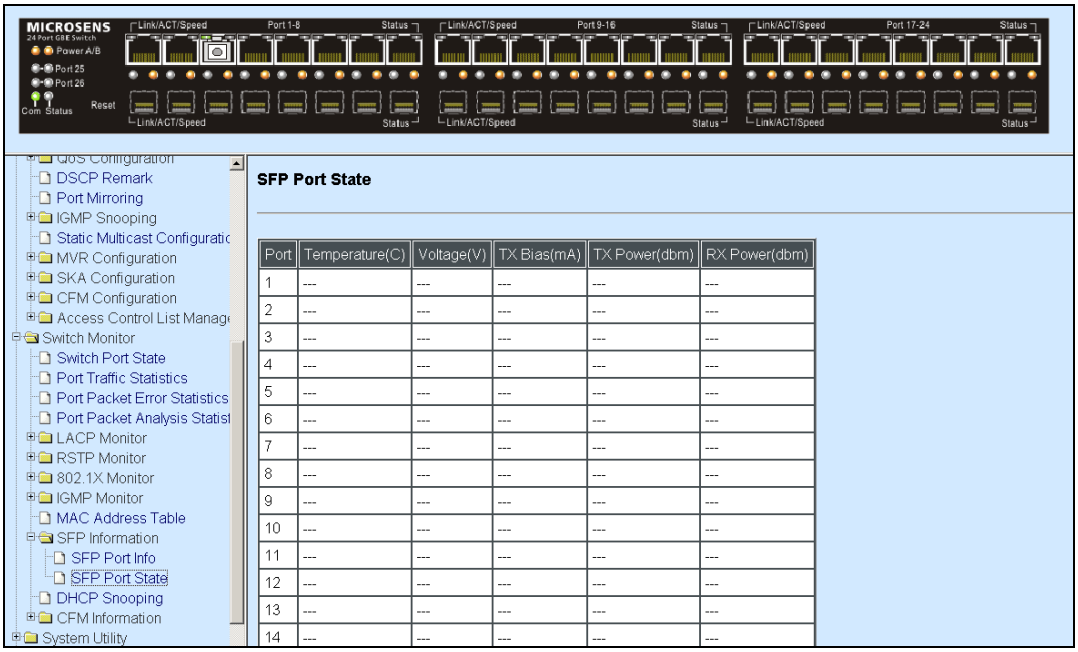
Vendor Name: Vendor name of the slide-in SFP Transceiver.

Vendor PN: Vendor PN of the slide-in SFP Transceiver.

Vendor SN: Vendor SN of the slide-in SFP Transceiver.

4.5.10.2 SFP Port State

Select **SFP Port State** from the **SFP Information** menu and then the following screen page appears.



Port	Temperature(C)	Voltage(V)	TX Bias(mA)	TX Power(dbm)	RX Power(dbm)
1	---	---	---	---	---
2	---	---	---	---	---
3	---	---	---	---	---
4	---	---	---	---	---
5	---	---	---	---	---
6	---	---	---	---	---
7	---	---	---	---	---
8	---	---	---	---	---
9	---	---	---	---	---
10	---	---	---	---	---
11	---	---	---	---	---
12	---	---	---	---	---
13	---	---	---	---	---
14	---	---	---	---	---

Port Number: The number of the SFP module slide-in port.

Temperature (C): The Slide-in SFP module operation temperature.

Voltage (V): The Slide-in SFP module operation voltage.

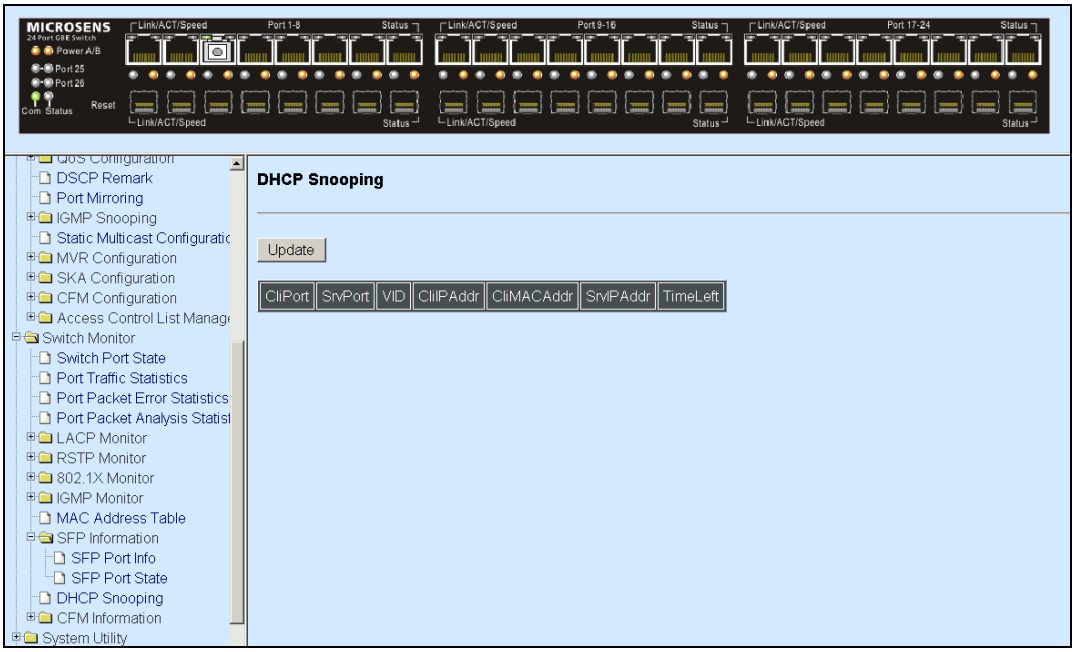
TX Bias (mA): The Slide-in SFP module operation current.

TX Power (dbm): The Slide-in SFP module optical Transmission power.

RX Power (dbm): The Slide-in SFP module optical Receiver power.

4.5.11 DCHP Snooping

DHCP Snooping displays the Managed Switch's DHCP Snooping table. Select **DHCP Snooping** from the **Switch Monitor** menu and then the following screen page appears.



Update: Click “Update” to update the DHCP snooping table.

Cli Port: View-only field that shows where the DHCP client binding port is.

VID: View-only field that shows the VLAN ID of the client port.

CliIP Addr: View-only field that shows client IP address.

CliMAC Addr: View-only field that shows client MAC address.

SrvIP Addr: View-only field that show the server IP address.

TimeLeft: View-only field that shows DHCP client lease time.

4.5.12 CFM Information

Ethernet Connectivity Fault Management (CFM) is an end-to-end and service-to-service Ethernet layer operations, administration and maintenance (OAM) 802.1ag protocol. It includes practical connectivity monitoring, fault verification and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.
As its name implies, IEEE 802.1ag focuses on the connectivity fault management which provides the following four features on each Virtual Local Area Network (VLAN) basis.

- **Fault Detection/Fault notification**
- **Fault verification**
- **Fault isolation**

Fault Detection/Fault notification

IEEE 802.1ag supports fault detection through Continuity Check Messages (CCM). CCM is somewhat like the “keep-alive” message. By default, every 802.1ag-capable network device (ND) sends out “heart-beat” style CCM periodically. Hence, by configuring a list of expected existent remote 802.1ag-capable NDs, the local 802.1ag-capable ND can detect the health status of its connection to the remote ND.

Fault verification
IEEE 802.1ag supports fault verification through Loopback Messages (LBM) and Loopback Reply (LBR). The LBM/LBR mechanism is similar to ICMP “ping” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault verification by ICMP “ping” in such a network environment.

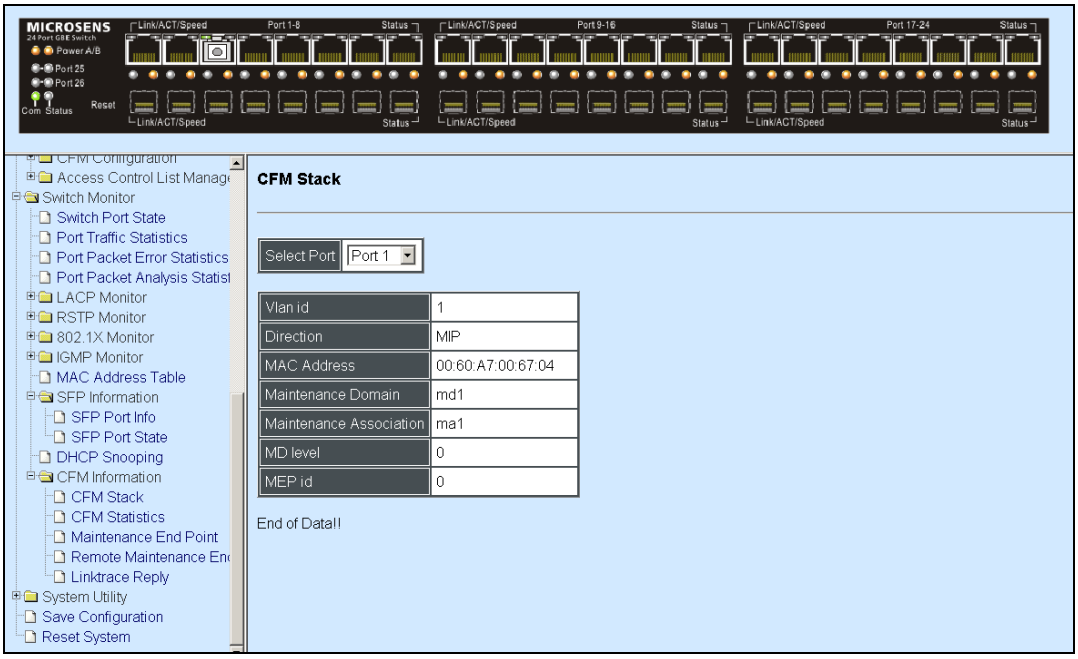
Fault isolation
In addition to the LBM/LBR mechanism, IEEE 802.1ag supports fault isolation through Linktrace Messages (LTM) and Linktrace Reply (LTR). The LTM/LTR mechanism is similar to the “trace route” function in the IP network. However, since the interfaces of an ND in an Ethernet network may not possess their individual IP address, the operator can not achieve fault isolation by “trace route” in such a network environment.

IEEE 802.1ag also defines the following network error status to be conveyed in the CCM.

MACstatus
Either some remote ND is reporting its interface as not ready to pass both the data packets and BPDU, or all remote NDs are reporting their interfaces as not able to pass ordinary data packets.
RemoteCCM
The ND is not receiving valid CCMs from at least one of the remote NDs.
ErrorCCM
The ND has received at least one invalid CCM whose CCM Interval has not yet timed out.
XconCCM
The ND has received at least one CCM from either another VLAN or a lower MD Level whose CCM Interval has not yet timed out.

4.5.12.1 CFM Stack

Select **CFM Stack** from the **CFM Information** menu and then the following screen page appears.



Select a port from the pull-down menu, then the selected port's CFM stack status will be displayed.

VLAN ID: View-only field that shows the VLAN ID of this selected port.

Direction: View-only field that shows which direction CCMs are sent.

MAC Address: View-only field that shows the MAC address of this Managed Switch.

Maintenance Domain: View-only field that shows the MD of the selected port.

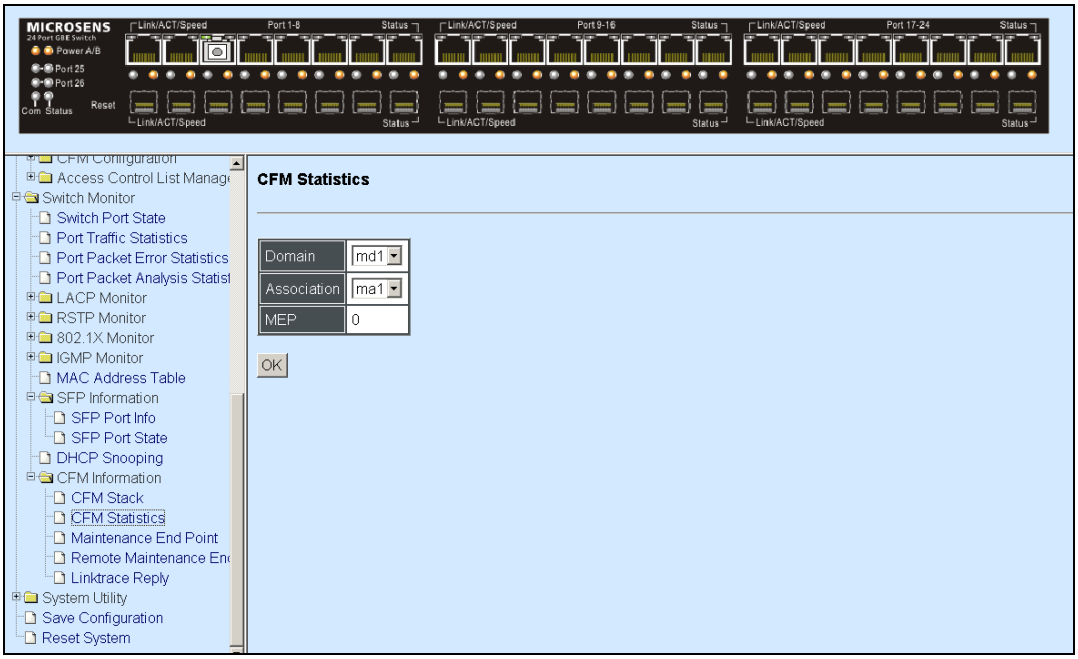
Maintenance Association: View-only field that shows the MA of the selected port.

MD Level: View-only field that shows the MD level of the selected port.

MEP ID: View-only field that shows the MEP ID of the selected port.

4.5.12.2 CFM Statistics

Select **CFM Statistics** from the **CFM Information** menu and then the following screen page appears.



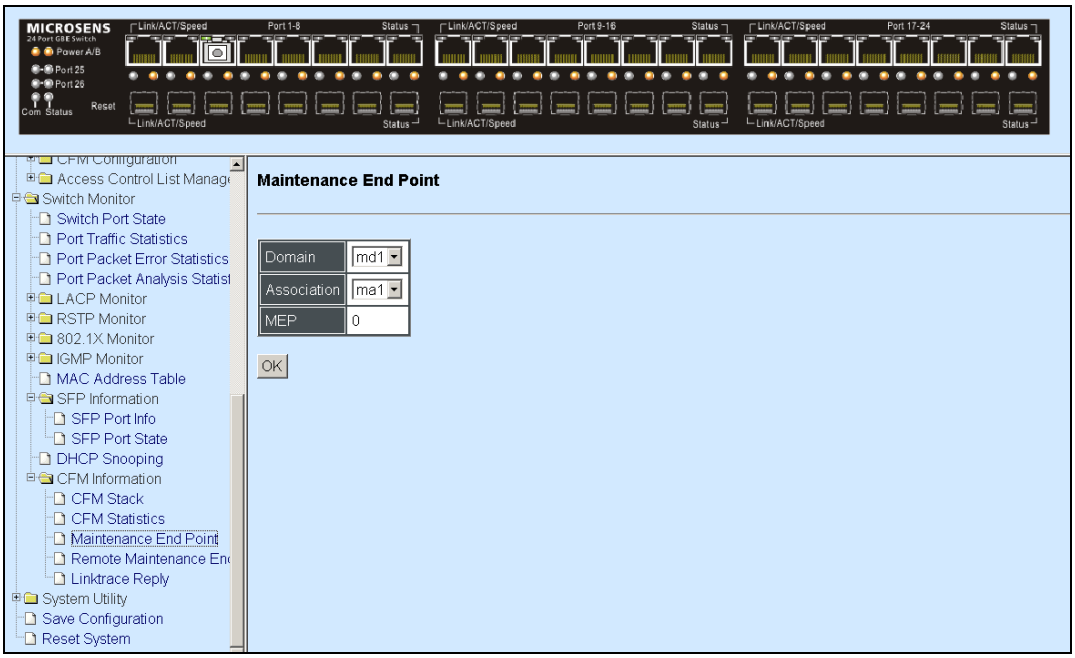
Domain: Select a current Maintenance Domain from pull-down menu.

Association: Select a current Domain from pull-down menu.

MEP: View only shows current MEP ID.

4.5.12.3 Maintenance End Point

Select **Maintenance End Point** from the **CFM Information** menu and then the following screen page appears.



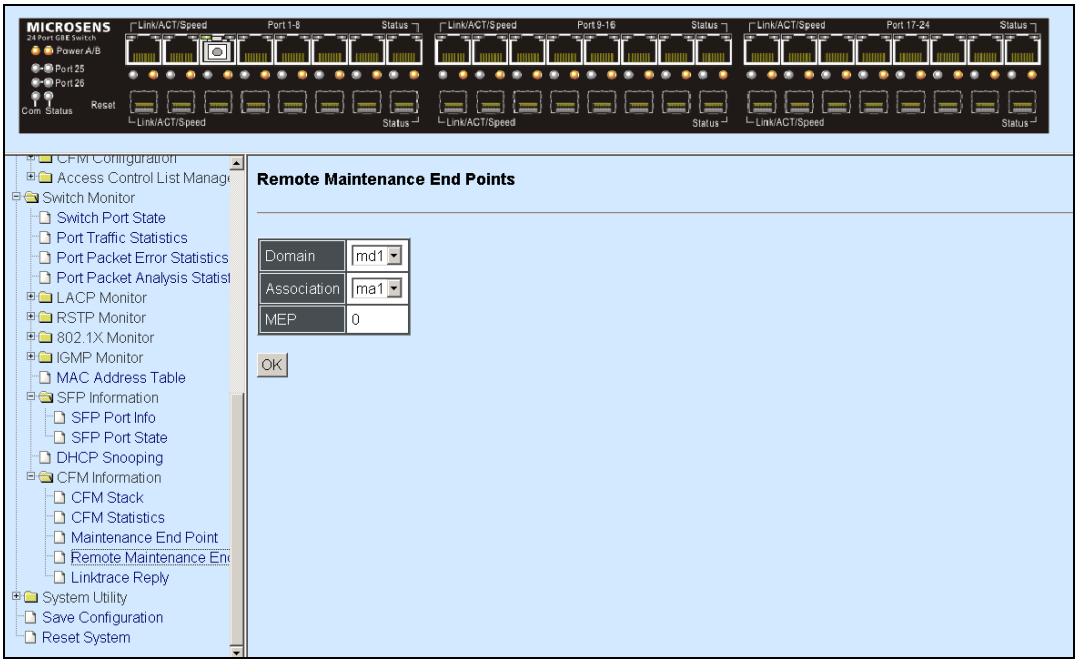
Domain: Select a current Maintenance Domain from pull-down menu.

Association: Select a current Domain from pull-down menu.

MEP: View only shows current MEP ID.

4.5.12.4 Remote Maintenance End Points

Select **Remote Maintenance End Points** from the **CFM Information** menu and then the following screen page appears.



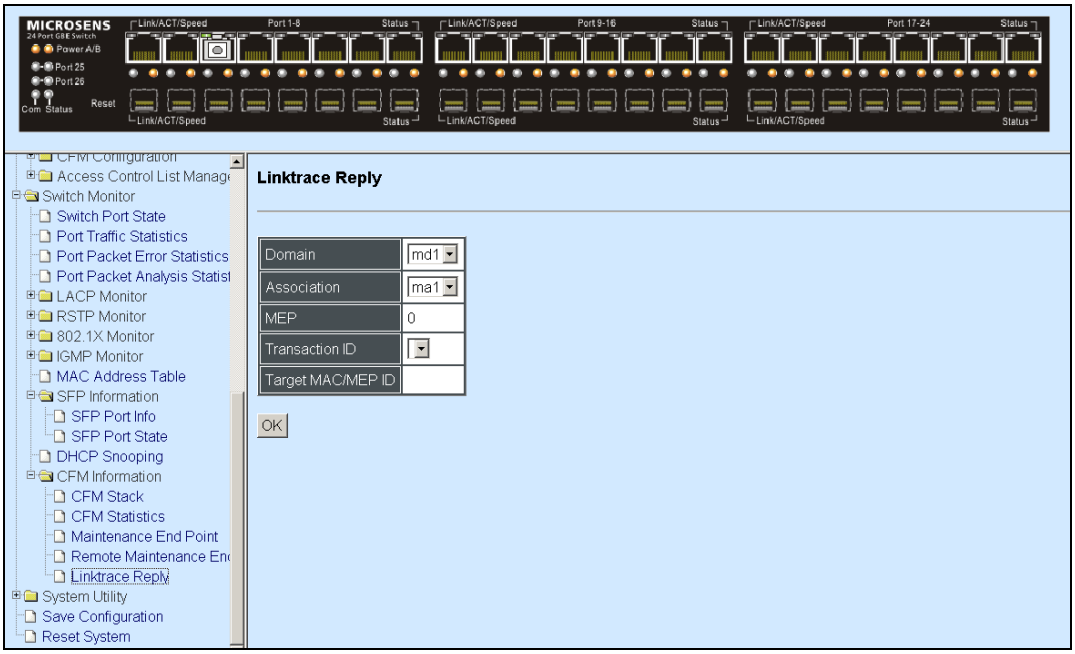
Domain: Select a current Maintenance Domain from pull-down menu.

Association: Select a current Domain from pull-down menu.

MEP: View only shows current MEP ID.

4.5.12.5 Linktrace Reply

Select **Linktrace Reply** from the **CFM Information** menu and then the following screen page appears.



Domain: Select a current Maintenance Domain from pull-down menu.

Association: Select a current Domain from pull-down menu.

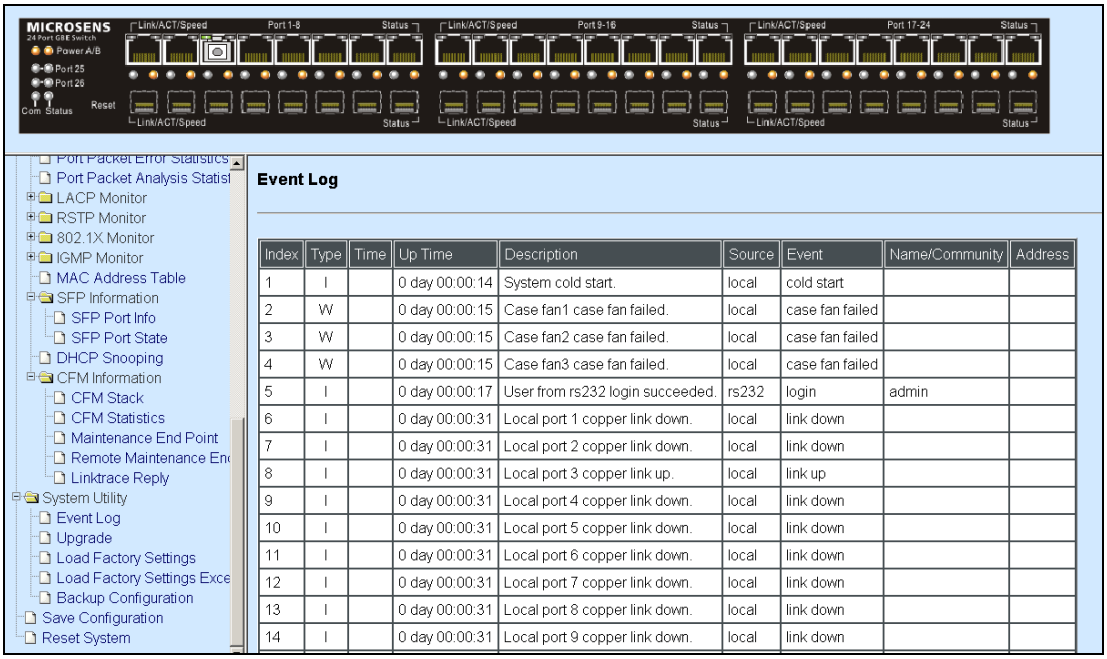
MEP: View only shows current MEP ID.

Transaction ID: Select a transaction ID from the pull-down menu.

Target MAC/MEP ID: When you select a transaction ID, the corresponding target MAC/MEP ID that runs a linktrace testing will be shown.

4.6 System Utility

System Utility allows users to easily operate and maintain the system. Select the folder **System Utility** from the main menu and then the following screen page appears.



Event Log

Index	Type	Time	Up Time	Description	Source	Event	Name/Community	Address
1	I		0 day 00:00:14	System cold start.	local	cold start		
2	W		0 day 00:00:15	Case fan1 case fan failed.	local	case fan failed		
3	W		0 day 00:00:15	Case fan2 case fan failed.	local	case fan failed		
4	W		0 day 00:00:15	Case fan3 case fan failed.	local	case fan failed		
5	I		0 day 00:00:17	User from rs232 login succeeded.	rs232	login	admin	
6	I		0 day 00:00:31	Local port 1 copper link down.	local	link down		
7	I		0 day 00:00:31	Local port 2 copper link down.	local	link down		
8	I		0 day 00:00:31	Local port 3 copper link up.	local	link up		
9	I		0 day 00:00:31	Local port 4 copper link down.	local	link down		
10	I		0 day 00:00:31	Local port 5 copper link down.	local	link down		
11	I		0 day 00:00:31	Local port 6 copper link down.	local	link down		
12	I		0 day 00:00:31	Local port 7 copper link down.	local	link down		
13	I		0 day 00:00:31	Local port 8 copper link down.	local	link down		
14	I		0 day 00:00:31	Local port 9 copper link down.	local	link down		

1. **Event Log:** Event log can keep a record of system's log events such as system warm start, cold start, link up/down, user login/logout, etc. They will be kept only when your CPU version is A06 with Boot ROM version A08 or later version. If your CPU or Boot ROM version is earlier than the one mentioned above, all events will lose when the system is shut down or rebooted.

2. **Update:** This allows users to update the latest firmware, save current configuration or restore previous configuration to the Managed Switch.

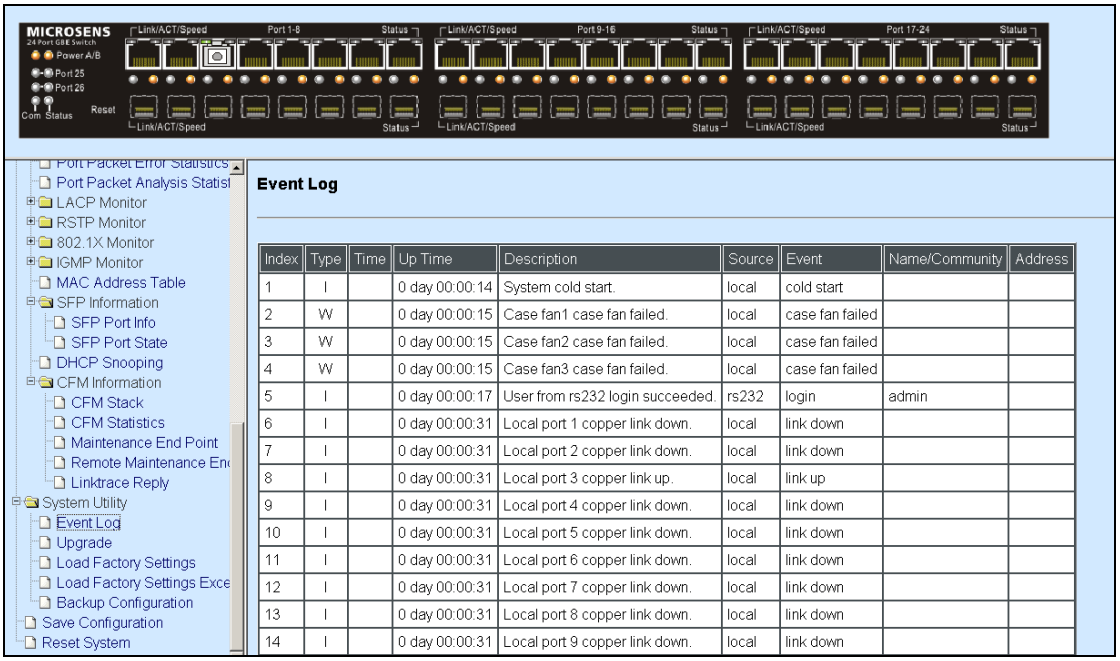
3. **Load Factory Setting:** Load Factory Setting will set the configuration of the Managed Switch back to the factory default settings. The IP and Gateway addresses will be set to the factory default as well.

4. **Load Factory Setting Except Network Configuration:** Selecting this function will also restore the configuration of the Managed Switch to its original factory default settings. However, this will not reset the IP and Gateway addresses to the factory default.

5. **Backup Configuration:** Set up the configuration for backup.

4.6.1 Event Log

Event log keep a record of user login, logout timestamp information. Select **Event Log** from the **System Utility** menu and then the following screen page appears.

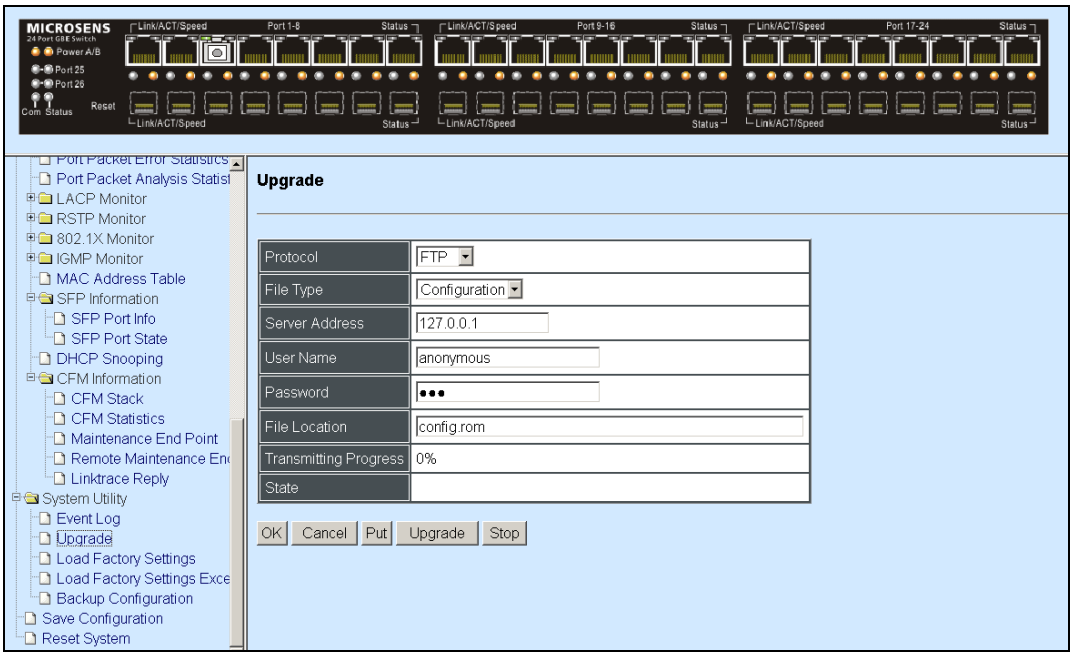


Index	Type	Time	Up Time	Description	Source	Event	Name/Community	Address
1	I		0 day 00:00:14	System cold start.	local	cold start		
2	W		0 day 00:00:15	Case fan1 case fan failed.	local	case fan failed		
3	W		0 day 00:00:15	Case fan2 case fan failed.	local	case fan failed		
4	W		0 day 00:00:15	Case fan3 case fan failed.	local	case fan failed		
5	I		0 day 00:00:17	User from rs232 login succeeded.	rs232	login	admin	
6	I		0 day 00:00:31	Local port 1 copper link down.	local	link down		
7	I		0 day 00:00:31	Local port 2 copper link down.	local	link down		
8	I		0 day 00:00:31	Local port 3 copper link up.	local	link up		
9	I		0 day 00:00:31	Local port 4 copper link down.	local	link down		
10	I		0 day 00:00:31	Local port 5 copper link down.	local	link down		
11	I		0 day 00:00:31	Local port 6 copper link down.	local	link down		
12	I		0 day 00:00:31	Local port 7 copper link down.	local	link down		
13	I		0 day 00:00:31	Local port 8 copper link down.	local	link down		
14	I		0 day 00:00:31	Local port 9 copper link down.	local	link down		

Click **Clear** to clear all Event log records.

4.6.2 Update

The Managed Switch has both built-in TFTP and FTP clients. Users may save or restore their configuration and update their Firmware on-line. Select **Update** from the **System Utility** menu and then the following screen page appears.



Protocol: Select the preferred protocol, either FTP or TFTP.

File Type: Select the file to process, either Firmware or Configuration.

Server Address: Enter the specific IP address of the File Server.

User Name: Enter the specific username to access the File Server.

Password: Enter the specific password to access the File Server.

File Location: Enter the specific path and filename within the File Server.

Click **OK** to start the download process and receive files from the server.
A transmitting progress will be displayed during file transfer. Once completed, a process-completed message will pop up to remind user.

Click **Put** to start the upload process and transmit files to the server.
A transmitting progress will be displayed during file transfer. Once completed, a process-completed message will pop up to remind users.

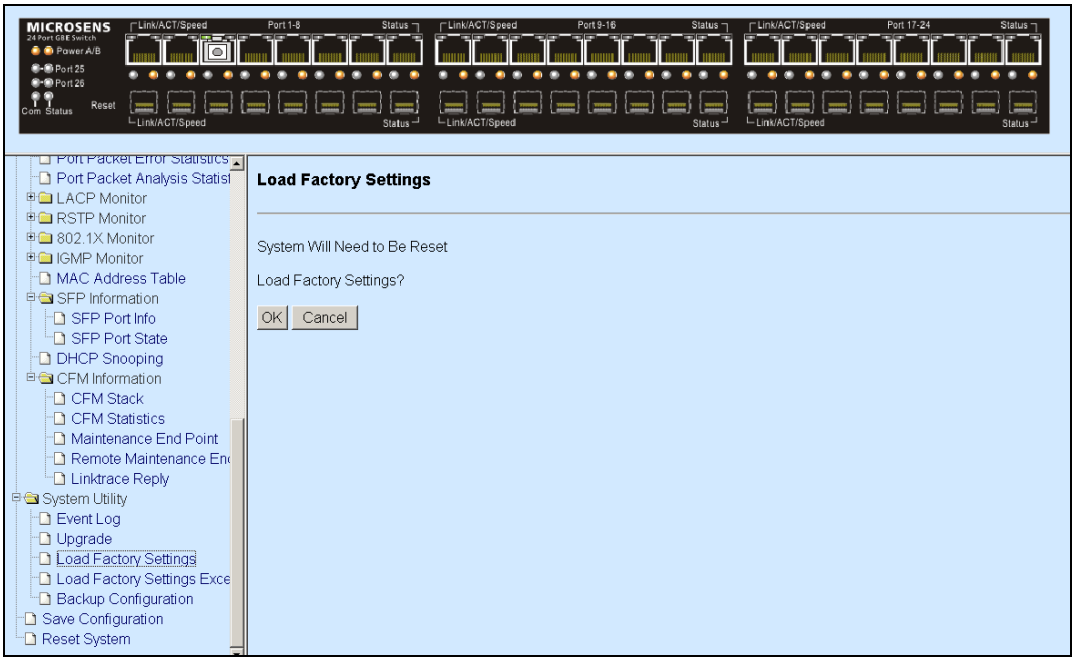
Click **Stop** to abort the current operation.

Select **Update** then press **Enter** to instruct the Managed Switch to update existing firmware/configuration to the latest firmware/configuration received. After a successful-update message pops up, the Managed Switch will need a reset to make changes effective.

4.6.3 Load Factory Settings

Load Factory Setting will set all the configuration of the Managed Switch back to the factory default settings, including the IP and Gateway address. **Load Factory Setting** is useful when network administrators would like to re-configure the system. A system reset is required to make all changes effective after Load Factory Setting.

Select **Load Factory Setting** from the **System Utility** menu and then the following screen page appears.



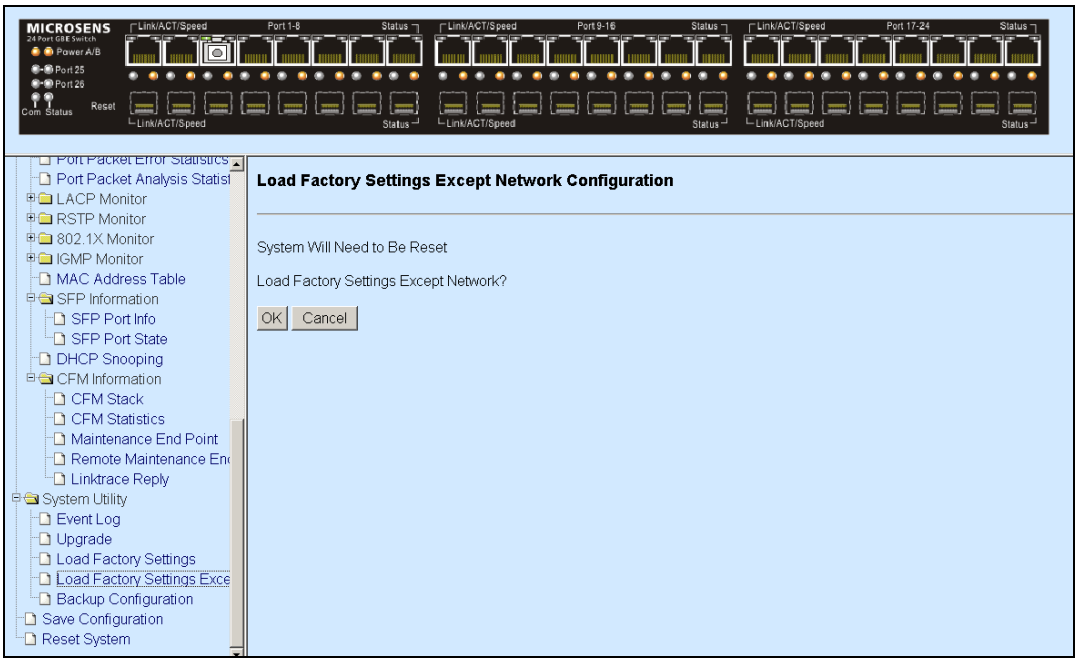
Click **OK** to start loading factory settings.

4.6.4 Load Factory Settings Except Network Configuration

Load Factory Settings Except Network Configuration will set all the configuration of the Managed Switch back to the factory default settings. However, IP and Gateway addresses will not restore to the factory default.

Load Factory Settings Except Network Configuration is very useful when network administrators need to re-configure the system “REMOTELY” because conventional Factory Reset will bring network settings back to default and lose all network connections.

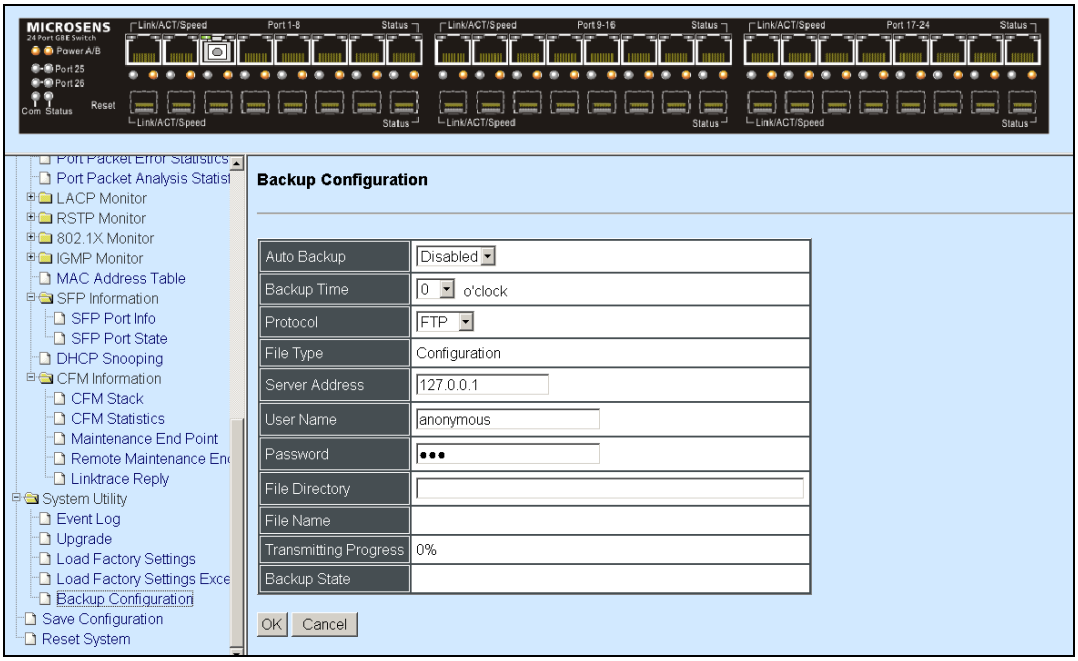
Select **Load Factory Setting Except Network Configuration** from the **System Utility** menu, the following screen page shows up.



Click **OK** to start loading factory settings except network configuration.

4.6.5 Backup Configuration

Select **Backup Configuration** from the **System Utility** menu and then the following screen page appears.



Auto Backup: To enable or disable auto backup. The default setting is disabled.

Backup Time: Set up the time (24-hr clock) to automatically backup once a day. If the remote server fails or does not exist, this function allows the system to retry around once per minute until the system completes a successful backup or the system times out (next hour).

Protocol: Select FTP or TFTP server to backup

Server Address: This field is for FTP or TFTP server IP address.

User Name: This field is for FTP server only.

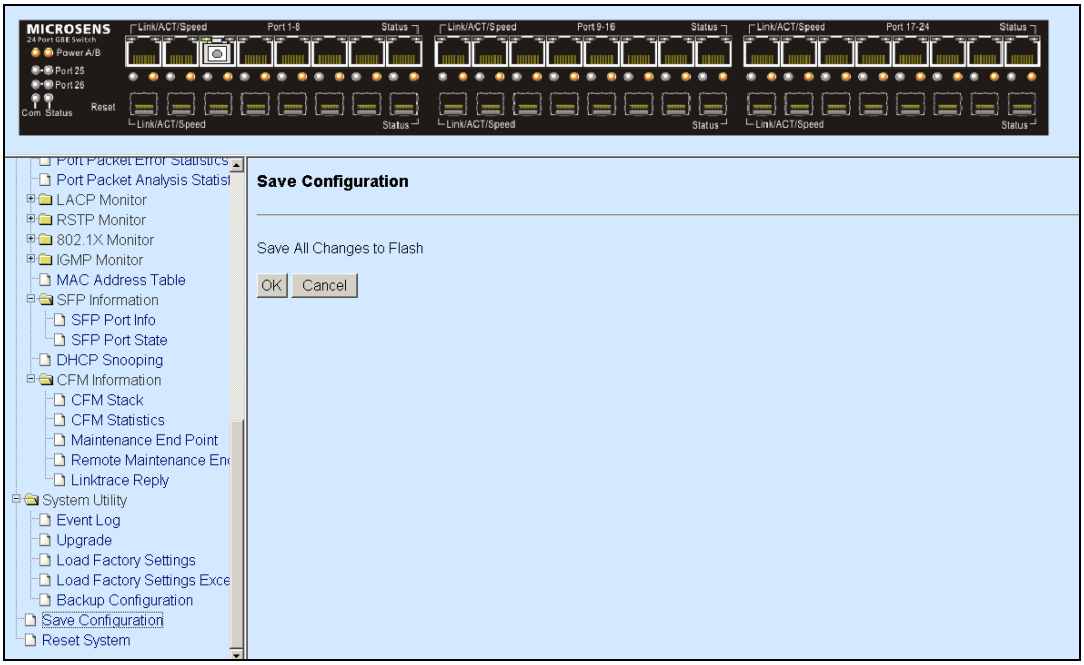
Password: This field is for FTP server only.

File Directory: The place where backup files will be saved to.

File Name: The name of backup files which will be saved by date.

4.7 Save Configuration

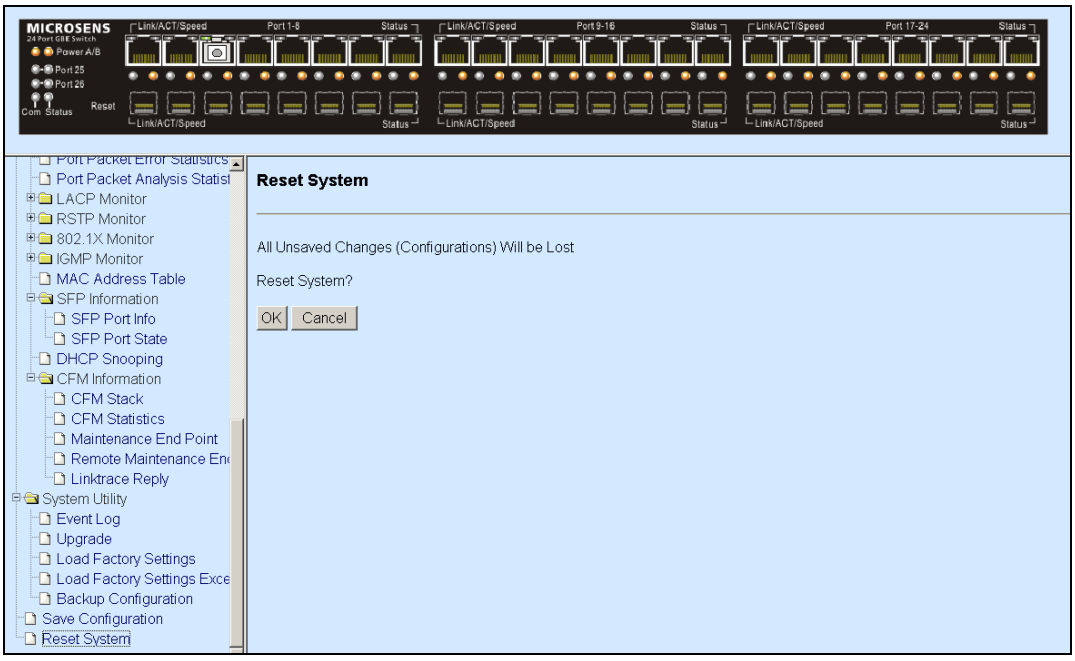
In order to save configuration setting permanently, users need to save configuration first before resetting the Managed Switch. Select **Save Configuration** from the Console main menu and then the following screen page appears.



Click **OK** to save the configuration.

4.8 Reset System

After any configuration changes, **Reset System** can make changes effective. Select **Reset System** from the Console main menu and then the following screen page appears.



Click **OK** to perform System Reset.